ENGIN STORAGE
TN 22 7A3 0.13
Applied Sci
Engineering

South Australia.

A REVIEW

OF

MINING OPERATIONS

IN THE

STATE OF SOUTH AUSTRALIA

DURING THE

HALF-YEAR ENDED DECEMBER 31st, 1910.

LIBRARY JAN 9 1969 UNIVERSITY OF TORONTO

No. 13.

DO NOT REMOVE FROM THIS ROOM

ISSUED BY T. DUFFIELD, J.P., *Secretary for Mines*,

UNDER THE AUTHORITY OF THE

HONORABLE JOHN VERRAN, M.P.,

Minister of Mines.

DEPARTMENT OF GEOLOGICAL SCIENCES
UNIVERSITY OF TORONTO

Adelaide:

R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1911.

South Australia.

A REVIEW

OF

MINING OPERATIONS

IN THE

STATE OF SOUTH AUSTRALIA

DURING THE

HALF-YEAR ENDED DECEMBER 31st, 1910.

No. 13.

ISSUED BY T. DUFFIELD, J.P., *Secretary for Mines*,

UNDER THE AUTHORITY OF THE

HONORABLE JOHN VERRAN, M.P.,

Minister of Mines.

Adelaide:

R. E. E. ROGERS, GOVERNMENT PRINTER, NORTH TERRACE.

1911.

Miners' Rights and Privileges thereunder.

A miner's right is obtainable at the Department of Mines, Adelaide, also at the issuing stations in the various mining districts, at a cost of 5s.

A miner's right is in force for one year from the date of issue, and may be renewed at any time during its currency for another term of one year on payment of 5s.

The holder of a miner's right is authorised to prospect on any mineral lands for any metal, mineral, coal, or oil, and to peg out (of the prescribed shape and dimensions) gold, mineral, coal, and oil claims, and also leases of a like nature.

AREAS AND WORKING CONDITIONS.

GOLD LEASES—Maximum area, 20 acres; working conditions, one man to every five acres.

MINERAL LEASES—40 acres; one man to every 10 acres.

MISCELLANEOUS LEASES—

Salt	640 acres;	special conditions.
Gypsum	640 "	one man to every 40 acres.
Mining Works	10 "	one man.
COAL OR OIL LEASES	640 "	one man to every 40 acres.
GOLD DREDGING LEASES	200 "	special conditions.
MINERAL CLAIMS	40 "	
GOLD CLAIMS	30ft. x 30ft., alluvial; 100ft. x 600ft., reef.	

Gold claims must be constantly worked—one man for each claim—and mineral claimholders must employ two men for each claim. Amalgamation of either gold or mineral claims reduces the labor conditions by one-half.

Gold, mineral, coal, and oil leases are granted for a term of 42 years—the two former at a rental of 1s. per acre per annum and a royalty of 6d. in the pound on net profits, the latter at a rental of 6d. per acre per annum until coal or oil is found in payable quantities, when 1s. per acre is payable and a royalty of 6d. in the pound on the net profits.

The Minister may permit, for the concentration of labor, of the amalgamation of not more than four adjoining gold or mineral leases.

Any number of gold, mineral, coal, or oil leases may be held by one person.

Licences to search for twelve months for precious stones, mineral phosphates, oil, rare metals, minerals, and earths are issued on specific mineral lands, not exceeding five square miles in area for one person, a fee of 20s. being charged for each square mile or portion thereof. These licences give a preferential right to a lease over a portion of the area, as prescribed.

PREFACE.

The average price of "Standard" copper for the half-year was £56 3s. 2d. per ton; "Best Selected" averaged £60 3s. 9d. Copper mining operations have, therefore, been much restricted.

Good gold returns have been obtained from the Deloraine Mine, near Kersbrook, and the encouraging results of crushings from Mount Grainger, and from Copperlinka (near Olary), should revive some faith in our north-east mineral country.

In order to make further tests as to the economic value of the Leigh Creek coal field, boring operations have been started by the Government.

T. DUFFIELD,

Secretary for Mines.

February 22nd, 1911.

INDEX.

PAGE.

Accidents, Mines and Quarries 17
Ajax 8, 13
Alma Extended 8, 12
Assistant Government Geologist -
  Appointment of 9
  Reports by 21
Assays at School of Mines 17

Basedow, Dr. H. 9
Battery Returns 12
Bellah 33
Belalie 7, 32
Benalack's 32
Black Eagle 33
Boring, Drainage by 19
Boring Operations 13
Brown Coal 21
Broken Range (Rapid Bay) 24

Cairngorm 9
Ceralene 9
Corundum 10
Coal 9
Commonwealth Mine 9
Copper, Average Prices of 6, 10
Copperlinka 8, 27
Crushing and Cyanide Plants 11

Deloraine 7, 30
Decennial Returns 18
Diamond Jubilee 33
Drainage, South-East—Reports by Government Geologist 19
Dustholes 8, 28

Ediacara 33
Eveline 24

Glenloth Government Plant 11
General Notes 7
Green Rock 34
Gordon Reward 24
Government Geologist 9, 19
Golden Boomerang 8
Gypsum 9

Hamley 7, 26
Homeward Bound 9

Kanappa 31
Kapunda 6
Kangaroo Island China Stone and Clay 23
King's Bluff 27
  " Battery 12

PAGE.

Kirkeek's Treasure 8, 12

Leigh Creek Coal 13
Limestone, Ornamental 21
Lux 9

Mercury 22, 25
Mining Operations for Half-year 5
Men Employed 5
Mount Coffin 34
  " Fitton South 6, 31
  " Grainger 8, 28
  " Torrens Government Plant 11
Moorlands, Coal 21
Mutooroo 6

Ochre 9

Paramatta and Yelta 6
Paull's Consolidated 33
Parachilna, Limestone at 21
Phil-Ma-Cool 33
Petersburg, Government Plant 10

Radium, Olary 10
  " Mounts Painter and Pitt 10
Returns, Gold 10
  " Mineral Production 18
Reports, Government Geologist 19
  " Assistant Government Geologist 21
  " Inspector Jones 23

Salt 9
Sherlock, Hundred of (Coal) 21
Smoky Quartz 9
Subsidies 15

Tarcoola Blocks 7, 12
  " Government Plants 7, 11
Topaz 9

Union Consolidated 7
Union Jack 8
Uranium 9

Wadnaminga 8
Wallaroo and Moonta 6
Wandilta 13, 14
Warra Warra 23
  " West 23
Windy Creek 32
Wild Dog 34
Woodside Mines 7

Mining Operations during the Half-year ended December 31st, 1910.

AREA AT PRESENT HELD UNDER MINING ACTS (DEC. 31ST, 1910).

Nature of Holding.	Number.	Area.
Mineral leases	293	14,999 acres
Gold leases	70	1,304 "
Gold dredging leases	1	34 "
Miscellaneous leases	41	7,584 "
Mineral claims	301	9,993 "
Occupation licences	210	105 "
Search licences	139	144,460 "
Coal claims	30	19,220 "
Gold claims	6	15 "
Total holdings	1,091	197,714 acres

REGISTERED FROM JUNE 30TH, 1910, TO DECEMBER 31ST, 1910.

Mineral claims	86	2,838 acres
Gold leases	4	80 "
Mineral leases	14	377 "
Miscellaneous leases	2	200 "
Miners' rights	363	—
Search licences	107	105,420 "
Coal and oil claims	6	3,840 "
Gold claims	9	19 "
Total	591	112,774 acres

MEN EMPLOYED.

Estimated number of men employed in mining and mineral works, December 31st 1910 :—

Copper	4,150
Gold	950
Salt	450
Silver-lead	60
Other minerals	570
Total	6,180

GENERAL NOTES.

The average price of standard copper per ton for the six months is £56 3s. 2d., and the range of prices—lowest, July 13th, £52 17s. 6d.; highest, November 8th, £58 6s. 3d. The average for the year 1910 is £57 3s. 3d., and for the 10 years, 1901–10, £64 14s.

With copper, our principal metal, at such a low figure throughout the half-year, it naturally follows that, except at the old and well-established mines, mining operations in connection with the red metal have been considerably restricted, and prospecting for new finds has practically ceased until better markets prevail.

The *Wallaroo and Moonta* Mines treated 80,281 tons of ore and produced, including precipitates, 3,204 tons of copper, a quantity which compares favorably with the returns of previous half-years. The operations consisted of mining work on various lodes, vein-stuff hauled to the surface, crushed, sorted, and concentrated by special machinery or treated chemically; the products forwarded to Wallaroo for smelting and refining into copper.

The well-known *Paramatta and Yelta* Mines, situated near Moonta, have been purchased by the Government. They have of late years been worked by a French company, and from 1903 to the slump in the copper market of 1907 produced about £250,000 worth of copper. There is a smelting plant in the Yelta connected with the Paramatta shafts by a tramway.

The area of the land secured by the Government over this transaction is 1,349 acres, and, with the exception of the proportion required for mining and residential purposes, it is proposed to cut it up into agricultural blocks of from 20 to 30 acres each.

The sum paid for the property is £6,000, and the bargain is regarded as a good one.

The *Kapunda* Mine has been almost idle, the only output being 28 tons of 20½ per cent. ore raised by tributers.

Not much work has been done at *Mutooroo*. A few tributers have marketed about 20 tons of 20 per cent. ore, and about 5 tons of copper have been obtained from precipitation of the mine water.

The smelting plant of the *Union Consolidated Copper Mines Co., Yudnamutana*, is not yet in operation. Returns show 28 men at work driving, crosscutting, and extending benches ready to break down ore.

The *Mount Fitton South* Mine has had little done at it for some considerable time past. When in work many rich parcels of ore were sent away from it, some going as high as 48 per cent. copper. Gold and silver are also present in the ore. An official report will be found on page 31.

The *Belalie* Mine, which has been reported on favorably several times by the Inspector of Mines, has been granted Government assistance in order to aid development below the 100ft. level. The work is proceeding satisfactorily, and the inspector considers the prospects, both at the north and south lodes, to be very encouraging.

Assistance has been granted to the *Hamley* by the Government, to open out the mine, put up rises, and generally facilitate the working of the mine.

An official report, page 26, states that the prospects of the mine are exceedingly good.

The *Tarcoola Blocks* Company has treated 295 tons of stone for the half-year, the return being 509ozs. of gold bullion worth £1,976. The grand totals of the crushings at this mine from the starting of the battery to the end of 1910 are 29,093 tons crushed for 41,893ozs., worth £127,500.

A vigorous policy development is in progress, and the evidence gained by the workings so far is distinctly reassuring to those who have maintained faith in the probable value of the mine at depth.

The *Tarcoola Government Battery* has treated 167½ tons of stone for 163½ozs., but the *Glenloth Battery* has been almost idle.

Deloraine, situated in the Hills district about 4 miles north-east of Kersbrook.—Three hundred and five tons 13cwts. have been treated for 363ozs. 5dwts. of gold. Of this tonnage 98 tons containing too much copper to be treated by the cyanide process were sent to the Electrolytic Co.'s works at Port Kembla, and returned 127ozs. 8dwts. 16grs. of gold, and also copper to the value of £59 4s. 1d. Twelve men were employed on the holding, and a considerable amount of work in the way of shaft-sinking, driving, and stoping was done. The returns are very encouraging, and the prospects of the mine are good. A report on the property by the Inspector of Mines is given on page 30.

No work has been in progress at the *Woodside Mines* during 1910, but the syndicates' property is being placed under option with a view of raising local capital to work the mines on a large scale, and in this connection the following extract from an official report of May, 1908, will be of interest :—" No work, except the cyanidation of tailings, from which good results were obtained, has been done since 1897, when the Bird-in-Hand Mine was unwatered by Messrs. Shallcross and others, and was then examined by Mr. Joel Phillips, formerly Manager of the Broken Hill Junction, down to the 350ft. level. He found the lode to be from 8ft. to 12ft. thick, and his sampling averaged 16dwts. per ton. His report generally was very favorable, and he states that there is a long stretch of auriferous country which if properly opened up would give excellent returns. The last crushings of the original company (Captain J. Warren, manager) in 1889, were from the bottom levels, and 4,170 tons stone yielded 2,776ozs. of smelted gold, or 13dwts. 7½grs. per ton. In 1897 10,605 tons of tailings were cyanided in this mine, and gave 1,242ozs. of fine gold. These mines are only a short distance from the railway, there is abundance of fresh water for cyanide treatment, and wood is plentiful in the district.

A large company formed to take over and work the Bird-in-Hand and adjoining mines would have every reasonable prospect of success. The Woodside Gold Mining Syndicate owns the freehold of the Bird section. Historical details of the Woodside mines will be found in the " Record of Mines," page 326.

Returns from the *Kitticoola* (Reedy Creek) Mine show 261 tons of ore treated for 135ozs. 14dwts. 10grs. of gold, valued at £452 6s. 8d. A five-head battery has been erected on the mine, which is being worked on tribute, and a report on the property by Inspector Jones will be found on page 29.

From the dumps at the *Alma Extended* Mine (Waukaringa) 120 tons of ore yielded 60ozs. of gold.

Returns from the *Ajax* Mine (Waukaringa) show stoping and driving levels to be in progress. A well is in progress at the site where water was struck by No. 2 Government boring plant, and it is hoped that the Ajax and other mines in the locality will be greatly benefited.

Work is also in progress at the old *Union Jack* Mine, adjoining and northward of the Ajax, and 30 tons of ore have been raised.

Three parcels of ore from *Mount Grainger*, totalling 37 tons 15cwt., sent to Petersburg, yielded 113ozs. 19dwts 7grs. of gold, valued at £455 17s. 4d., or £12 2s. per ton. Mount Grainger has many loyal supporters amongst mining men, and the recent good finds should be helpful in obtaining the support required in order to work the place in a large way and in a proper and systematic manner.

A working option has been taken over the *Dustholes* property near Mount Grainger, and a 100ft. underlie shaft is in progress.

Returns from the *Golden Boomerang* show sinking, driving and prospecting, and 20 tons of crushing material raised ready for treatment.

Two parcels of ore from *Copperlinka*, 10 miles south of Olary, have been treated at the Petersburg Government works; 46 tons 14cwts., gave 35ozs. 2dwts. 2grs., worth £13[illegible] 7s. 11d., or 56s. per ton, and 71 tons 2cwts. yielded 50ozs. 3dwts. 9grs., worth £190 8s. 8d., or 53s. 6d. per ton. The Inspector of Mines states in his report, page 27, that the lode is from 3ft. to 5ft. wide, fairly defined, and likely to continue down, and that the mine, when properly opened out and worked on a large scale, should prove highly payable. The syndicate is to be congratulated on its deserved success, which it is also hoped will act as another reminder of the great mineral possibilities of our north-eastern country.

Some parcels of battery stone are being raised at *Wadnaminga*.

At *Kirkeek's Treasure* 256 tons of stone were crushed by the battery on the mine for 67ozs. 14dwts. 12grs., or 5dwts. 7grs. per ton; the tailings are valued at 5dwts. per ton.

From the *Lux* Mine about 33 tons of ore only returned 8dwts. of gold per ton, but further work is in progress to pick up the payable run of stone.

The *Homeward Bound* (Mannahill) subsidised shaft is down 194ft. where the lode is about 3½ft. thick, and at this point is of low grade. From the 165ft. level a test parcel of 4 tons 9cwts. was sent to Petersburg for treatment, and yielded 3ozs. 10dwts. 3grs.; a money value of £3 per ton.

At the *Wheal Ellen* (*Commonwealth*) Mine, near Strathalbyn, 2,313 tons of pyrites of an average assay value of 48 per cent. sulphur were raised and marketed. The developmental work done consisted of 150ft. driving at 240ft. level, main shaft unwatered from 240ft. to bottom, 300ft. shaft cleaned out and timbering secured; also unwatered and cleaned out 70ft. of drives and crosscuts at the 300ft. level. No auriferous stone was treated by the mine battery during the half-year.

Ochreous Earths.—A few tons have been marketed from the Copper King Mine, 10 miles north of Beltana, from Oodlawirra, and also from near Willunga.

About 16,000 tons of ***Gypsum*** were obtained from Yorke Peninsula during the year 1910.

From near Bimbowrie has been obtained specimens of carbonate of lime colored green and blue by malachite and azurite, and sufficiently hard to admit of cutting and polishing into very handsome ornaments. This has been done by an Adelaide jeweller (Mr. Bassé) and the pretty and unique articles of "*Cerulene*," as the combination has been christened, have been much appreciated by tourists seeking for samples of South Australian gems.

Some very fine specimens of South Australian *smoky quartz*, *cairngorm*, have also been cut and mounted.

Mr. F. C. Hales has obtained from near Long Gully, Echunga, some fine *topaz* specimens, which have been cut into beautiful gems.

Salt.—Owing to the late wet season, the salt lakes were flooded longer than usual, and during most of the time (July to December, 1910) were under water. As they dried sufficiently to crust in December men were employed, and the full season's output will be shown in the next returns.

The Government having determined to make further tests as to the economic value of the *Leigh Creek Coalfield*, work has been commenced there. Details will be found in Mr. A. W. Matthew's report on boring operations.

Attention is called to some *interesting reports by the Government Geologist, page* 19, on the feasibility of draining the surface waters of portion of the South-East district by means of bores and shafts sunk to the porous beds of limestone, sandstone, sand, &c., which exists at a short distance from the surface. The examples quoted as to the good results following operations on a small scale should induce further and systematic testing of this simple and inexpensive method of drainage.

In August Dr. Herbert Basedow was appointed ***Assistant Government Geologist.*** He possesses high and varied qualifications, being M.D. and Ch.D. (Gottingen), Ph.D. (Breslau), and B.Sc. (Adelaide); he is also a Fellow of the Geological Society, a Tate medallist, and a member of many learned societies. Dr. Basedow has since his appointment published a very valuable pamphlet on Economic Geology and detail official reports, and his work when previously in the Govern-

ment service was of high class and much appreciated; he has also been appointed a Government medical officer, and already his medical knowledge has been of great service to lonely prospectors out back.

Radium.—Samples of the large deposits of radio-active ores worked by the *Radium Hill Co.*, near *Olary*, have been distributed amongst English and Continental firms for testing purposes, and also a small parcel was sent to the Director of the Bairnsdale School of Mines (Mr. Radcliff). His treatment proved so satisfactory that it was decided to have a larger parcel tested by him on commercial lines; this has been done, and the secretary of the company has published Mr. Radcliff's report, in which he demonstrates that the ore is amenable to his treatment on commercial lines, and that the process presents no special metallurgical difficulties, and is not expensive.

Corundum and Radium, near Mounts Painter and Pitt in the Yudnamutana district of the Flinders Range (*vide* also Record of Mines, page 358).—Dr. Douglas Mawson, who visited this interesting locality in company with Mr. W. B. Greenwood, the original prospector, determined *Uranium* in the large lode body which exists at this place, and the search licences secured by Messrs. Mawson and Greenwood are now worked by a prospecting company called *The Radium Extraction Company of S.A.*, Mr. J. K. Samuel, secretary. Operations are in progress under the well-known prospector, H. Fabian; and Mr. Greenwood is engaged in prospecting the neighboring country on behalf of the company. Dr. Mawson took with him to England a ton sample of Corundum, &c.

COPPER.

AVERAGE MONTHLY PRICE OF COPPER, JULY-DECEMBER, 1910.

	Standard. £	s.	d.		Best Selected £	s.	d.
July	54	5	5	..	58	14	5
August	55	17	5	..	59	17	3
September	55	6	5	..	59	9	5
October	56	16	2	..	60	14	5
November	57	15	3	..	61	15	0
December	56	18	2	..	60	12	0
Average for the six months	56	3	2	..	60	3	9

RANGE OF PRICES—

November 8th	58	6	3
July 13th	52	17	6

AVERAGE PRICE OF STANDARD COPPER FOR THE LAST TEN YEARS.

	£	s.	d.		£	s.	d.
1901	66	19	1	1906	87	8	10
1902	52	8	3	1907	82	1	11
1903	58	3	2	1908	60	0	10
1904	59	0	7	1909	58	17	2
1905	64	16	10	1910	57	3	3

Average for the 10 years, £64 14s.

CRUSHING AND CYANIDING PLANTS.

RETURNS FROM GOVERNMENT CRUSHING AND CYANIDING PLANTS FOR THE HALF-YEAR ENDED DECEMBER 31ST, 1910.

Name of Mine.	Locality.	Ore Treated.	Gold Recovered.	Value of Gold.	Yield per Ton, in Shillings.
		Tons cwts. qrs.	Ozs. dwts. grs.	£ s. d.	
PETERSBURG GOVERNMENT BATTERY AND CYANIDE.					
Copperlinka	Olary	46 14 0	35 2 2	130 7 11	56/-
Lux	Olary	24 0 0	9 6 19	34 15 1	29/-
Mount Grainger	Mount Grainger ..	9 5 0	16 11 4	65 4 10	141/-
Mount Grainger	Mount Grainger ..	10 10 0	81 1 14	324 6 4	617½/-
Mount Grainger	Mount Grainger ..	18 0 0	16 6 13	65 6 2	72½/-
Copperlinka	Olary	71 2 0	50 3 9	190 8 8	53½/-
Homeward Bound ..	Mannahill	4 9 0	3 10 3	13 7 0	60/-
Lux	Olary	8 17 0	3 14 14	12 4 3	27½/-
Total		192 17 0	215 16 6	836 0 3	87/-
Grand total since starting of battery ..		4,204 11 1	3,970 0 3	14,775 8 0	70/-
MOUNT TORRENS GOVERNMENT BATTERY AND CYANIDE.					
Deloraine	Kersbrook.....	78 0 0	163 9 8	569 19 7	146/-
Kitticoola	Palmer	14 15 0	18 17 8	69 5 11	94/-
Schuberts	Mount Torrens....	16 5 0	7 5 4	24 17 0	30/-
Deloraine	Kersbrook.....	124 13 0	69 18 14	269 18 10	43/-
Total		233 13 0	259 10 10	934 1 4	80/-
Grand total since starting of battery ..		9,635 14 1	5,645 11 12	21,287 11 5	44/-

The Petersburg and Mount Torrens Battery and Cyanide Plants are worked alternate months. In addition to the crushings recorded, numerous assays and amalgamation tests of small parcels of ore have been made.

TARCOOLA GOVERNMENT BATTERY.

No. of Parcel.	Name of Mine.	Ore Treated.	Gold Recovered.	Value of Gold.	Yield per Ton in Shillings.
		Tons cwts. qrs.	Ozs. dwts. grs.	£ s. d.	
154	Curdnatta	42 0 0	52 1 2	200 4 6	95/-
155	Perseverance.....	25 0 0	33 0 8	115 4 9	92/-
156	Curdnatta	17 0 0	13 7 17	46 12 3	55/-
157	The Gem	17 0 0	15 15 22	50 16 10	60/-
158	Government Mine Reserve	5 10 0	4 5 23	14 11 11	53/-
159	Government Mine Reserve	42 0 0	18 3 8	60 12 7	29/-
160	Curdnatta	19 0 0	26 15 17	95 17 6	101/-
Total		167 10 0	163 10 1	584 0 4	69/-
Total since starting of battery.....		2,411 10 0	3,076 19 2	10,885 16 3	90/-
GLENLOTH GOVERNMENT BATTERY.					
57	New Glenloth B. & M. Co.	9 0 0	2 4 5	7 6 5	16/-
Total		9 0 0	2 4 5	7 6 5	16/-
Total since starting of battery		1,707 0 0	1,778 3 0	5,979 12 9	70/-

RETURNS FROM CRUSHING AND CYANIDING PLANTS (OTHER THAN GOVERNMENT) FOR THE HALF-YEAR ENDED DECEMBER 31ST, 1910.

Name.	Ore Treated.			Gold Recovered.			Value.			Yield per Ton, in Shillings.
	Tons	cwts.	qrs.	Ozs.	dwts.	grs.	£	s.	d.	
TARCOOLA BLOCKS COMPANY'S BATTERY AND CYANIDE PLANT.										
Battery treatment	295	0	0	509	0	0	1,976	0	0	137
Total	295	0	0	509	0	0	1,976	0	0	137
Grand Total since starting of Tarcoola Blocks Co.'s battery, May 16th, 1901, to Dec. 31st, 1910..	29,093	0	0	41,893	0	0	127,500	0	0	88
KIRKEEK'S TREASURE BATTERY, NIILLINGHOO.										
Battery treatment	256	0	0	67	14	12	226	4	11	18
Total	256	0	0	67	14	12	226	4	11	18
KITTICOOLA, REEDY CREEK.										
Battery treatment	261	0	0	135	14	10	452	6	8	35
Total	261	0	0	135	14	10	452	6	8	35
ALMA EXTENDED, WAUKARINGA.										
Battery treatment	120	0	0	60	0	0	240	0	0	40
Total	120	0	0	60	0	0	240	0	0	40
KING'S BLUFF, OLARY.										
Battery treatment	120	0	0	98	0	0	296	2	0	49
Total	120	0	0	98	0	0	296	2	0	49

TOTAL BATTERY AND CYANIDE RETURNS FROM ALL PLANTS FOR SIX MONTHS ENDING DECEMBER 31ST, 1910.

Name.	Ore Treated.			Gold Recovered.			Value.			Yield per Ton, in Shillings.
	Tons	cwts.	qrs.	Ozs.	dwts.	grs.	£	s.	d.	
Petersburg Government Plant	192	17	0	215	16	6	836	0	3	87/-
Mt. Torrens " ..	233	13	0	259	10	10	934	1	4	80/-
Tarcoola " ..	167	10	0	163	10	1	584	0	4	69/-
Glenloth " ..	9	0	0	2	4	5	7	6	5	16/-
Tarcoola Blocks Co.'s Battery	295	0	0	509	0	0	1,976	0	0	137/-
Kirkeek's Treasure " ..	256	0	0	67	14	12	226	4	11	18/-
Kitticoola " ..	261	0	0	135	14	10	452	6	8	35/-
Alma Extended " ..	120	0	0	60	0	0	240	0	0	40/-
King's Bluff " ..	120	0	0	98	0	0	296	2	0	49/-
Total	1,655	0	0	1,511	9	20	5,552	1	11	67/-

REPORT ON BORING OPERATIONS.

By Mr. A. W. MATTHEWS.

During the half-year the boring operations have been confined to the Wandilta Mine, Kadina, and to the Leigh Creek Coal Mine, Leigh Creek; the total boring for the period being 1,058ft., and includes shifting and erecting Sullivan drill at Wandilta, also dismantling and taking plant from Waterworks yard and erecting same at the Leigh Creek Coal Mine.

PARTICULARS OF BORES.

No. 7 Bore, Wandilta Mine.—Angle, 20ft. in 100ft; passed through 2ft. lode at 236ft. assaying 3 per cent. copper. Continued from 410ft. to 646ft. From 410ft. to 485ft. we drilled in country with seams of calcite, and from 485ft. to 528ft. blue country with seams of calcite and spar. At 528ft. we entered a calcite formation carrying a little sulphide, which continued to 540ft., making total drilling in same 12ft. From 540ft. to 551ft. blue country and spar. From 552ft. to 553ft. calcite showing little sulphide; 553ft. to 555ft. calcite and grey country; 555ft. to 556ft. calcite showing sulphide; 556ft. to 569ft. calcite and grey country; 569ft. to 571ft. calcite formation showing sulphide; from 571ft. to 646ft. country rock. At this depth boring was discontinued.

The No. 7 bore, Wandilta Mine, besides proving a lode 2ft. wide assaying 3 per cent. copper at 236ft., passed through a calcite formation 12ft. wide at between 528ft. and 540ft.; also at 552ft. to 553ft. and 555ft. to 556ft., and again at 569ft. to 571ft. calcite formations, which although low grade where intersected by the bore, proved the continuation of the copper-bearing zon ·e

No. 8 Bore, Wandilta Mine.—Angle, 20ft. in 100ft. Depth, 803ft. The erection of the plant was completed on August 4th, and boring started with 3½in. bit. After passing through the surface loam and limestone we entered kaolin and sandstone, and continued in same to 96ft. 6in. We then met country rock, with occasional small veins of quartz and calcite, which continued to 420ft. From 420ft. to 803ft. we drilled in country rock mixed with calcite and felspar. This bore did not show any mineral, and appears to be in footwall country, so boring was discontinued and plant dismantled, and part sent to Leigh Creek Coal Mine. A drill, calyx and diamond combined, obtained from the Waterworks Department. was also forwarded to Leigh Creek, and has now been erected and boring started,

No. 1 Bore, Leigh Creek Coal Mine.—Vertical. On arrival of the staff at Leigh Creek work in connection with the erection of the plant was pushed on. Roads had to be made over the various watercourses between the siding and the site for the bore, storage tanks and pumps fixed for supply of fresh water, dams made, and pipe line laid to supply bore with water. The erection of the plant was completed on December 12th, and boring started with 6½in. bit., the nature of the country passed through being—first 4ft. surface loam, then 8ft. alluvial, then 4ft. hard conglomerate, followed by gypseous clay. Total depth, 19ft.

The bore has been continued to 372ft. From 19ft. to 30ft. gypseous clay, then shale to 113ft. 9in., then 6in. calcareous shale, then shale to 119ft. 6in. From 119ft. 6in. to 122ft. calcareous shale, then shale to 132ft. 1in.; then 3in. showing pyrites. From 132ft. 4in. to 161ft. shale, with two seams of pyrites at 138ft. 3in. and at 143ft. 4in. From 161ft. to 161ft. 6in. calcareous shale, then shale to 167ft. 2in., then 1ft. calcareous shale followed by shale to 180ft. At 180ft. 3in. calcareous

shale, followed by shale showing small seams of pyrites and small bars of calcareous shale to 372ft. The results of the boring at Leigh Creek are not far enough advanced to give any idea of ultimate value.

No. 2 Boring Plant.

This has been employed in the Waukaringa district, and was successful in striking a water supply, quantity undetermined yet, at a depth of 160ft. close to the Ajax Mine. A well is now in progress here; drives will be made for storage, and it is hoped that local treatment of the ore from the Ajax and other mines in the locality will be resumed.

The drill is now being erected for prospecting boring at the Rapid Bay Copper Mine.

WANDILTA MINE.

Report by Mr. A. W. Matthews.

The erection of the pumping and winding plant being completed, sinking was resumed and the shaft sunk to a depth of 191ft., making total sinking 131ft. The progress has been necessarily slow on account of the large quantity of water which the shaft is making, namely, from 10,000galls. to 14,000galls. per hour. The results from the sinking have been very satisfactory, and are as follows:—From 68ft. to 118ft. we sunk in a large calcite formation, which shows grey and green ore in bunches and seams. At 108ft. the calcite showed grey ore and oxide, and from 108ft. to 116ft. we obtained some nice grey ore and oxide, which also showed a little sulphide. At 118ft. we passed through the calcite formation, having sunk in same 50ft., and entered blue country and continued in same to 134ft. At this depth we entered a formation of quartz and calcite, carrying a lot of mica and showing green carbonates, and continued in same to 147ft., when we met hard blue country rock showing mundic and intersected with quartz and calcite veins carrying rich yellow sulphide. This country continued to 165ft., at which depth a change started to come in from the north end of the shaft, the country being softer and showing a good deal of calcite. From 171ft. to 180ft. we were sinking in lode formation consisting of blue and grey country, calcite, feldspar, and quartzite. Through this formation there are veins ranging from 1in. to 1ft. in thickness which all carry rich ore, principally yellow sulphide coated black, and a little purple ore. From 180ft. to 191ft. the shaft continued in lode formation, and some good ore was obtained from the various leaders, samples of which have been sent to the Mines Department for inspection.

At 191ft. sinking was discontinued for the time to enable us to make a start cutting plats and to get ready for the second plunger, which will be fixed at the 180ft. level. This work is now being pushed on as rapidly as possible.

The developments so far have been very satisfactory, and the water difficulty has now been practically overcome. All the water making has been overhead, and we have now, by putting in dams behind the timbers and carrying launders and pipes, succeeded in catching this up, and will have no difficulty in running same into the cistern at the 180ft. level. This will mean, practically speaking, a dry shaft in the bottom, and consequently when this work is completed progress will be more rapid.

In conclusion, I may state that the various formations passed through in the shaft all showed more copper than the cores obtained from the bore led us to expect. This gives every indication that when we cut the lode met with in the bore at 319ft. that it will prove far more valuable than the drill cores showed.

All the machinery is in good order and working well.

SUBSIDIES.

The Legislature provided in the Mining Act, 1893, and in previous measures for the encouragement of Mining.

The following schedule shows what subsidies have been paid from the inception of the system to December 31st, 1910, and the sums repaid. In the ordinary way these repayments are made from profits—50 per cent. of such profits being devoted to repayments. In two instances only have the profits won enabled full repayments to be accomplished—the Crystal Mine, at Echunga, which repaid £76 7s. 6d. from that source, and the once-famous New Alma and Victoria Mine, Waukaringa, which repaid in full the first subsidy, £3,000. The remainder of the recoveries was derived from sales of mining plant held as security. The total subsidies advanced is £53,356 7s. 10d., of which £6,111 13s. 9d. has been recovered, leaving a debit balance of £47,244 14s. 1d. Portion of this outstanding debt is represented by machinery that has fallen into the hands of the Government; add to this the value of the metals won, and the State in general will probably have benefited beyond the money value of the debit balance.

STATEMENT OF SUBSIDIES PAID FROM COMMENCEMENT TO DECEMBER 31ST, 1910.

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.			Amount Repaid.		
		£	s.	d.	£	s.	d.
Adelaide Crushing, Grinding, and Amalgamating Mill Co.	—	100	0	0	—		
Algebuckina Gold Mining Syndicate	Algebuckina	52	10	11	52	10	11
Alma Extended Gold Mining Co.	Waukaringa	3,000	0	0	22	5	0
Backhouse, T. S.	Worturpa	100	0	0	—		
Barossa Enterprise Gold Mining Coy.	Barossa, Hundred of	232	2	6	—		
Belalie Copper Mining Syndicate	Bundaleer	200	4	2	—		
Bevilaqua & Angel	Palmer (near)	57	18	0	—		
Bird-in-Hand Gold Mining Co, Ltd.	Woodside	3,000	0	0	—		
Blackfellow's Creek Gold Mining Co., Ltd.	Kuitpo, Hundred of	660	6	7	35	0	0
Callington Copper Mining Co.	Callington	148	8	7	—		
Cockburn Copper Mining Co., N.L.	Mutooroo	273	18	5	—		
Commonwealth Silver-lead Co., Ltd.	Strathalbyn, Hund. of	750	0	0	—		
Copper Hill Mining Co., N.L.	Kadina	391	15	0	—		
Countess of Jersey Gold Mining Co., N.L.	Wadnaminga	321	0	0	—		
Currency Creek Copper Mining Co.	Currency Creek	28	6	5	20	0	3
Crystal Gold Mining Co.	Echunga	563	17	6	176	7	6
Ding Dong Copper Mining Syndicate	Kanmantoo, Hund. of	124	0	4	—		
Duke of Cornwall Gold Mining Syndicate	Mount Pleasant	458	17	4	43	10	0
Eagle Silver Mining Co, Ltd.	Glen Osmond	500	0	0	—		
Echunga Proprietary Hydraulic Gold Sluicing Co., N.L.	Echunga	500	0	0	20	0	0
Ediacara Consols Silver Mining Co., N.L.	Ediacara	651	12	1	375	17	0
Enterprise Copper Mining Co., N.L.	Barossa, Hundred of	150	0	0	9	16	0
Enterprise Excelsior (Barossa Amalgamated)	"	2,000	0	0	—		
Eureka Gold Mining Co., Ltd.	Woodside	1,500	0	0	—		
Fifth Creek Central Silver and Copper Mining Co., N.L.	Fifth Creek	253	2	4	—		
Fortress Hill Mining Syndicate	Fortress Hill	60	0	0	—		
Glenloth Mining, Battery, & Options Co., N.L.	Glenloth	515	4	7	515	4	7
Glenloth Wells Pioneer Blocks Co., Ltd.	"	100	0	0	22	18	5
Gumeracha Gold Mining Syndicate	Gumeracha	75	0	0	—		
Golden Point Claims	Wonna	50	0	0	—		
Great Ironclad Gold Mining Co.	Teetulpa	218	6	9	—		
Hakendorf, C. H., and Williams, J. (Glenmarkie Mine)	Glenloth	221	17	6	—		
Hamley Copper Mining Co.	Wallaroo	1,500	0	0	—		
Heithersay, J., Mt. Grainger Medora Mines	Mount Grainger	77	7	7	—		
Homeward Bound and Klondyke Gold Mines, N.L.	Mannahill	192	17	1	—		

STATEMENT OF SUBSIDIES PAID—*continued.*

Name of Company or Person to whom Subsidy Granted.	Locality.	Amount Advanced.			Amount Repaid.		
		£	*s.*	*d.*	£	*s.*	*d.*
Hunter Bros. (Lady Millicent Mine)	Mochatoona	100	0	4	—		
Ireby Gold Mining Syndicate	Mount Grainger	35	4	3	—		
Kirkeek's Treasure Gold Mining Co.	Waukaringa	691	8	1	—		
King's Bluff G.M. Co., N.L.	Olary	200	0	0	—		
Kohinoor Gold Mining Co., N.L.	Kangaroo Island	137	17	0	—		
Kohinoor Mine (H. G. Taylor)	"	162	3	0	—		
Lady Alice Gold Mining Co.	Barossa, Hundred of	1,797	2	3	—		
Lady Franklin Syndicate	Port Lincoln	200	0	0	40	0	0
Leigh's Creek South Coal Mining Co., N.L.	Leigh's Creek	95	16	4	95	16	4
McMurtie's Claims	Kuitpo, Hundred of	199	19	11	—		
Medora and Grainger Gold Mines Syn., N.L.	Mount Grainger	344	2	2	—		
Mingary Gold Mining Co.	New Luxemburg	650	0	0	—		
Mount Victoria Mine	Bimbowrie	50	0	0	—		
Mount Malvern Silver Mining Co.	Blackwood	491	3	6	—		
Mount Malvern Silver-lead Mining Co., N.L.	Clarendon	1,347	15	3	—		
Mount Pangæus Gold Mining Co.	Hahndorf (near)	56	1	4	—		
Mount Monster Gold Mining Syndicate	Kuitpo, Hundred of	350	0	0	1	0	0
Mt. Grainger Ironclad Gold Mining Syn., Ltd.	Mount Grainger	21	18	10	—		
Mount Torrens Gold Mining Co.	Mount Torrens	1,000	0	0	—		
Musgrave Ranges Prospecting Association	Musgrave Ranges	47	2	0	—		
Mount Painter Corundum and Gem Syndicate	Mount Painter	47	3	1	—		
Morning Star Gold Mining Co.	Teetulpa	68	4	6	—		
Mutooroo Copper and Silver Mining Co., Ltd.	Mutooroo	500	0	0	500	0	0
Nackara Proprietary Copper Mining Co, N.L.	Nackara	100	0	0	—		
Nackara Proprietary Gold Mining Syndicate.	Nackara	100	0	0	—		
New Banksia Gold Mining Syndicate	Nairne	250	0	0	—		
New Alma and Victoria Gold Mining Co., Ld.	Waukaringa	3,000	0	0	3,000	0	0
New Ajax Consolidated Gold Mining Co., N.L.	"	750	0	0	—		
New Era Gold Mining Co, Ltd.	Woodside	1,000	0	0	—		
New Glenloth Battery and Mining Co., L.N.	Glenloth	498	7	4	—		
New Mount Grainger Gold Mines, N.L.	Mount Grainger	393	7	1	220	0	0
Northern Mining and Smelting Co., N.L.	Mount Fitton	350	0	0	—		
North Nairne Gold Mining Co.	Nairne	500	0	0	—		
North-West and West Australian Pros. Co.	North-west of S.A.	104	9	7	—		
North-West Prospecting Association, N.L.	Tarcoola	150	0	0	—		
Nil Desperandum Teetulpa Devt. Co., N.L.	Teetulpa	64	14	4	20	5	6
Nilpena Copper Mining Co., Ltd.	Blinman	290	5	3	—		
Onkaparinga Dredging and Mining Co.	Biggs' Flat	473	17	0	—		
Paull's Consolidated Copper Propy., N.L.	Burr Well	525	0	0	—		
Parara Mining Co., N.L.	Maitland	571	3	6	—		
Paringa Mining Syndicate	Callington	399	16	8	244	0	0
Paringa and West Kanmantoo Consolidated Copper Mine, N.L.	"	1,144	3	4	—		
Pioneer Gold and Copper Mining Syndicate	"	95	15	6	—		
Polmear, W. J. L.	Kadina	800	0	0	—		
Queen Bee Mining Co., N.L.	New Luxemberg	250	0	0	250	0	
Quorn Manganese and Silver Mining Co.	Quorn	10	9	10	—		
Rapid Bay Silver Mining Co., N.L.	Yankalilla, Hund. of	136	2	4	—		
Royal Charlie Gold Mining Co.	Mannahill	153	18	5	—		
Rees, R., Ajax Mine	Waukaringa	604	14	5	—		
Stainbank, A. T.	Fifth Creek	70	14	11	—		
Sliding Rock Copper Proprietary, N.L.	Sliding Rock	2,000	0	0	5	12	0
Tarcoola Blocks Gold Mining Co., Ltd.	Tarcoola	3,995	5	2	—		
Tarcoola Enterprise Gold Mining Co., N.L.	"	100	0	0	19	10	4
Tarcoola Proprietary Gold Mines, N.L.	"	150	4	4	9	15	
Teatree Gully Gold Mining and Pros. Assn.	Teatree Gully	234	5	7	—		
Teetulpa Mining and Crushing Co.	Teetulpa	349	11	4	—		
Teetulpa Prospecting Syndicate	"	49	15	6	—		
Tumby Bay Copper Mining Co., N.L.	Hutchison, Hund. of	186	17	2	—		
Victoria Hill Amalgamated Gold Mining Syn.	Barossa, Hundred of	38	12	6	—		
Victoria Tower Mining Co., N.L.	Mannahill	345	18	9	90	0	0
Warrakimbo Propy. Copper Mining Synd.	Barndioota, Hundred of	220	16	2	—		
Warra Warra Propy. Copper Mines, N.L.	Farina	322	4	11	322	4	11
Watt's Gully Gold Mining Co.	Gumeracha	50	0	0	—		

STATEMENT OF SUBSIDIES PAID—*continued.*

Name of Company or Person to whom Subsidy Granted	Locality.	Amount Advanced.	Amount Repaid.
		£ s. d.	£ s. d.
Watt's Gully Reef Claims	Gumeracha	50 0 0	—
Wolters, F. C., & Co	Echunga	25 0 0	—
Wallaroo Central Mining Co., N.L.	Kadina	500 0 0	—
Westward Ho Mine (Dr. H. Dixon)	Mannahill	1,000 0 0	—
Wohler, H., & Co.	Myponga	20 0 0	—
Wheal Turner Copper Mining Co., Ltd.	Prospecting on proposed line to Queensl'd Border	1,000 0 0	—
Winninninnie Gold & Silver Propy. Co., N.L.	Winninninnie	86 3 6	—
Woodside Boring and Mining Syndicate	Woodside	422 17 11	—
Worturpa Exploration and Mining Co., Ltd.	Worturpa	800 0 0	—
Yelta New Copper Mining Co, N.L.	Wallaroo	1,000 0 0	—
Totals	—	53,356 7 19	6,111 13 9

ASSAYS AT SCHOOL OF MINES.

NUMBER OF ASSAYS MADE FOR PUBLIC PURPOSES AT THE SCHOOL OF MINES ASSAY DEPARTMENT DURING THE SIX MONTHS ENDED DECEMBER 31ST, 1910.

	1910.						Totals.
	July.	August.	September.	October.	November.	December.	
Assays for the Warden of Goldfields	162	134	97	10	41	93	537
Assays for the Government Geologist	10	6	2	7	1	12	38
Free public assays	49	84	61	106	101	99	500
Totals	221	224	160	123	143	204	1,075

ACCIDENTS IN MINES AND QUARRIES.

A gratifying feature of the past year's mining operations in mines and quarries was the infrequency of serious accidents. In all seven accidents were reported. Act No. 858 of 1904, bringing quarries in the same category as mines as regards the controllingh and of the Chief Inspector of Mines, has been effective in safeguarding the interests of miners. The following table gives the number of accidents in mines and quarries since passing of the Act:—

ACCIDENTS IN MINES AND QUARRIES.

Accidents in Mines.				Accidents in Quarries.			
Year.	Total Number of Accidents Reported.	Number of Persons Injured.	Number of Persons Killed.	Year.	Total Number of Accidents Reported.	Number of Persons Injured.	Number of Persons Killed.
1904	5	1	4	1904	1	1	1
1905	3	1	3	1905	—	—	—
1906	5	—	3	1906	1	1	—
1907	8	4	6	1907	3	1	2
1908	5	4	1	1908	—	—	—
1909	6	5	1	1909	1	1	—
1910	5	3	3	1910	2	1	1

DECENNIAL RETURN SHOWING OUTPUT AND VALUE OF VARIOUS METALS AND MINERALS PRODUCED IN SOUTH AUSTRALIA SO FAR AS CAN BE ASCERTAINED.

Year.	Gold.		Silver.		Silver Lead Ore.		Copper.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Ounces.	£	Ounces.	£	Tons.	£	Cwts.	£
1901	4,918	16,613	—	—	1,410	11,357	134,719	468,606
1902	7,231	24,878	—	—	2,680	19,740	136,937	388,162
1903	8,650	28,650	7,086	804	211	1,267	129,812	417,116
1904	17,897	76,025	—	—	—	—	125,560	382,356
1905	10,983	45,853	—	—	—	—	130,959	426,511
1906	8,037	27,000	801	104	—	—	164,160	718,609
1907	5,609	20,540	5,845	780	1,000	11,000	158,620	690,000
1908	2,908	12,300	—	—	900	9,000	112,554	338,000
1909	7,111	30,206	1,660	167	70	416	113,940	334,584
1910	6,603	28,000	6,250	625	25	22	102,040	306,120
Totals.....	—	310,065	—	2,480	—	52,802	—	4,470,064

Year.	Copper Ore and Regulus.		Lead.		Ironstone Flux.		Limestone Flux.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.	Quantity.	Value
	Tons.	£	Cwts.	£	Tons.	£	Tons.	£
1901	1,866	23,011	1,360	722	—	—	—	—
1902	2,579	42,550	43,507	22,303	—	—	—	—
1903	7,069	54,922	14,408	8,799	84,932	46,712	—	—
1904	3,051	24,597	—	—	46,687	27,091	43,440	6,516
1905	2,563	28,434	1,040	369	84,483	48,577	44,498	4,791
1906	—	—	1,000	550	75,226	33,852	31,940	4,791
1907	—	—	—	—	84,600	38,100	31,100	5,800
1908	—	—	—	—	88,000	39,600	29,500	6,000
1909	1,230	4,003	140	90	16,120	8,296	13,765	2,464
1910	—	*9,350	400	260	46,200	21,945	18,600	3,720
Totals	—	186,867	—	33,093	—	264,173	—	34,082

Year.	Phosphate Rock.		Crude Salt.		Other Metals and Minerals.	Total Value.
	Quantity.	Value.	Quantity.	Value.	Value.	
	Tons.	£	Tons.	£	£	£
1901.....	—	—	—	-	2,219	522,478
1902.....	—	—	—	—	742	498,375
1903.....	1,000	1,000	40,000	12,000	100	571,371
1904.....	3,000	3,000	40,000	12,000	198	531,783
1905.....	5,000	5,000	32,500	13,000	1,261	573,796
1906.....	5,850	5,850	55,000	27,500	2,209	820,465
1907.....	8,000	8,000	75,000	37,500	2,500	814,220
1908.....	11,000	11,000	75,000	37,500	4,500	457,900
1909.....	3,772	3,697	51,407	25,594	3,873	413,390
1910.....	5,200	5,200	54,000	27,000	†13,600	415,942
Totals	—	42,747	—	192,094	31,202	5,619,669

* Bluestone, £5,980 Sulphuric Acid, £3,370. † Including Gypsum, £9,000; Pyrites, £3,270.

REPORTS

BY

The GOVERNMENT GEOLOGIST (H. Y. L. Brown, F.G.S.).

ON THE GEOLOGY OF THE COUNTRY SOUTH AND EAST OF THE MURRAY RIVER, WITH SPECIAL REFERENCE TO THE SUB-TERRANEAN WATER SUPPLY IN WELLS AND BORES ALONG THE PINNAROO AND BORDERTOWN RAILWAY—With Plan and Sections. (Obtainable at the Government Geologist's Office.)

ON DRAINAGE OF PORTION OF THE SOUTH-EASTERN DISTRICT BY MEANS OF BORES AND SHAFTS.

No. 1.

I have inspected the hundred of Kongorong and other areas in the Mount Gambier district, including the Dismal Swamp, with a view to ascertain the possibility of draining the surface water which accumulates in swamps and lagoons.

The geological formation of the country consists of more or less horizontal strata of Tertiary age, containing porous beds of limestone, sandstone, sand, &c., through which water from the interior is conducted towards and into the sea. From this fact the conclusion to be arrived at is that surface water such as that which accumulates from local rains in the lagoons and swamps and remains for long periods could be drained by means of shafts or bores connecting it with these porous beds (which in the case of limestone contains numerous caves and underground watercourses). This mode of drainage would be much less expensive and more efficient than the elaborate system of surface drainage which it has been proposed to adopt, and could be applied locally where any particular isolated areas required drainage. It would serve the same purpose as the natural "sink" or "runaway" holes which efficiently drain the surface water in other parts of the Mount Gambier district.

The result of my inspection has afforded me conclusive evidence that this idea of drainage is feasible. The shafts or bores would have to be sunk to a comparatively shallow depth, but deep enough to connect with the beds containing the natural subterranean water flow, with which it would be conducted away. This mode of drainage is applicable to the inland country which has a moderate elevation above sea level, and not to the low-lying areas along the coast. The general elevation above sea-level of the Dismal Swamp district is above 200ft. (19–9–10.)

No. 2.

With regard to the question [underground drainage], I have made an inspection of the country in the neighborhood of Bordertown. The geological formation is similar to that of the Dismal Swamp district, viz., Upper Tertiary clay, marl, and sandstone overlying Tertiary limestones. The surface, however, is more undulating and is drained to some extent by creeks which are bordered by long, narrow swamps along their courses. Besides these there are also isolated swamps and depressions, which in times of flood become connected with the creeks. "Runaway holes" or "sinks" in the limestone rock, into which the floodwater is discharged and conducted underground, exist in numerous places. Tatiara Creek discharges into Poocher Flat, which at the present time is a lagoon, occupying the greater portion of section 12, Wirrega. Although the creek is running into this lagoon in full flood, the volume of water drained away by the "runaway hole" is equal to that received from the creek, as is indorsed by the fact that the lagoon is not overflowing. In heavier floods the water overflows the flat country westward for some two miles, and is drained through other holes into the underground channels of the limestone. The volume of water which is absorbed daily from the Tatiara Creek through these natural "sink holes" is enormous. By enlarging them during the dry seasons.

and by making artificial outlets in suitable places, the draining off of floodwaters could be greatly accelerated, and swamps which under ordinary circumstances hold water for months could, I believe, be quickly drained. Waterholes and small lagoons occupying depressions caused by the subsidence of the ground, consequent on the dissolution of the limestone rock beneath the surface, are frequent. They are apparently "runaway holes" which have been closed and rendered impervious to water by accumulation of clay and mud. The clay and marly beds, which overlie the limestone in patches of variable thickness are favorable places for excavating tanks such as that which has been constructed near the Bordertown Railway Station. (4–10–10.)

No. 3.

I have recently revisited the Dismal Swamp and lagoons district with reference to the question of subterranean drainage of swamp land through the utilisation of the natural "sink holes" which are numerous in the locality. At the time of my first visit, in September last, a "sink hole" on section 261, hundred of Young, was connected by a small drain with a swamp which occupies portions of sections 284 and 261. Water has been discharging into this "sink hole" continually since that time, and has considerably reduced the volume of water in that swamp. On section 218, hundred of Young, a "sink hole" has been connected by a drain with a swamp, but this drain is now silted up. The work appears to have been done some years ago. On section 11w, hundred of Young, a considerable area of swamp land has been drained by this means, and crops were being planted on the reclaimed land at the time of my visit. So also on section 330, hundred of Young, close to Glencoe Head Station, land reclaimed by a similar means is being cultivated. I understand that this system of drainage was initiated some time ago in these places. On section 117E a drain was pointed out to me which connects a large swamp with a "sink hole" a short distance northward. This drain has evidently been used at one time, but is now blocked up by a road crossing.

In the hundred of Joanna, a short time ago, the floodwaters from Mosquito Creek and Mason's Swamp flowed over the Joanna main road and covered portions of sections 200, 82, 78, and 79. A "sink hole" on section 78 was submerged to a depth of about 10ft. above its usual water level. I am informed by Mr. Livingstone, M.H.R., who accompanied me to this place, that when the flood ceased running from Mosquito Creek this floodwater (covering approximately an area of one mile by half a mile) was absorbed by this "sink hole" within a period of 10 days, with the exception of a small area where the ground was below the level of the rest. This remaining water could be conducted to the "sink hole" by a drain about a quarter of a mile long.

These are good examples and object-lessons to show what can be done by utilising the natural "runaway" or "sink holes" for reclaiming swamp lands. "Sink holes" are numerous in the hundred of Young, and many could be made available for drainage. Besides these it can be inferred that many others exist which are not visible at the surface owing to the overburden of clay, sand, mud, &c. Some occur where the limestone rock is exposed; others are in country where the limestone is overlaid by deposits of sand and clay. The present "level of saturation" in the "sink holes" is only a few feet below the level of the surface water, yet water conducted into them continues to be absorbed without raising that level.

What is required is a systematic investigation of the strata in the vicinity of one of the "sink holes" in order to ascertain the position and thickness of the impervious beds (clays, &c.) which hold the water, and of the porous beds which absorb it (limestone, gravel, sand, &c.), so that it can be decided what operations may be undertaken to connect the surface water with the porous beds. The best means of obtaining the information required is boring with a light drill, which would obtain cores, such as the drill lately used in boring for water at Waukaringa, provided with a "calyx bit" instead of diamonds. (13–12–10.)

EXTRACTS OF REPORTS

BY

The ASSISTANT GOVERNMENT GEOLOGIST (H. Basedow, M.D., Ph.D., B.Sc., F.G.S.).

Brown Coal *on Section* 53, *Hundred of Sherlock*, 2½ *miles N. of Moorlands Siding*, on the Pinnaroo railway line. The locality was visited on August 29th, 1910, and the work found temporarily suspended in the shaft on account of a breakage the pump had sustained. Three men were, however, engaged upon sinking a bore to test the country in a S.E. direction. The shaft had been sunk to a depth of 60ft., and timbered for some distance down. Salt water, moreover, had risen to within 45ft. of the surface, so that an underground inspection was impossible. From the material that had been raised and emptied on the surface adjoining the shaft, and information as to depth supplied by Mr. Turner, jun., it was possible to reconstruct the section of strata passed through, as follows :—The formation is overlain at the surface by a nodular travertine limestone, about 4ft. in thickness. Thence follow deposits of bluish and green glauconitic clays to a depth of 22ft. ; red and yellow banded, fine-grained, argillaceous sandstone, with hollow ironstone concretions, to about 25ft. ; stiff bluish clays to 42ft. At this depth the carbonaceous bed was first encountered and traced to a depth of 60ft. from the surface, the bottom of the shaft still being in the formation. The carbonaceous bed consists of a friable lignite, or brown coal, that readily crumbles on being air-dried. The woody structure, is for the most part, still quite apparent, and many imprints and remains of leaves, together with globules of resin, are visible to the unaided eye. Much pyrites is present, the woody structure and vegetable tissues being often substituted by chemical precipitations of mineral sulphides. Air-dried samples burn moderately well, a strong sulphurous smell being emitted. The brown coal is of inferior quality, and of little use for direct application as a fuel in the crude state. There is, however, no reason why the material should not be eventually utilised as a means of securing various useful products, provided the carbonaceous bed can be proved to be of considerable dimensions. The same remarks naturally apply to other deposits of lignite in South Australia. The age of the formation is unquestionably Tertiary, as has already been indicated by the Government Geologist in a memorandum dated January 6th, 1910. By geological evidence of the beds in the field, and a study of the poorly preserved plant remains, which contain many species of eucalyptus, the beds are considered to be of Pliocene age, and certainly not older than Miocene. A comparison of this very young coal with Newcastle—or any other permo-carboniferous coal from New South Wales—is quite out of the question. The bore which was being sunk about 200 paces in a direction E. 25° S. from the shaft had reached a depth of 23ft. at the time of inspection, and had passed through similar clays as mentioned above. It has been asserted that in a bore on Mr. Blackham's property, some 2½ miles E. of the mine, a carbonaceous bed of about 30ft. thickness was found at a depth of 150ft. In most of the Government bores, too, of this district similar carbonaceous and lignite beds have been pierced at various depths. (31–8–10.)

Cambrian Limestone for Ornamental Purposes at Parachilna.—The formation occurs about 5 miles E. of Parachilna, and skirts the Flinders Ranges on the W. as low undulations trending N. and S. Typical exposures of the beds are few, but their presence can be determined at the surface by cappings of travertine and marl for some considerable distance S. in the direction of Edeowie Gorge, and also in a N. course towards Beltana. The upper members of the Cambrian beds consist of a compact bluish-grey limestone, in parts sub-crystalline, containing many fossils, notably the interesting class of archæocyathinæ. The fossils, being siliceous, weather from their matrix on the surface, and so become more conspicuous

than when seen on a freshly fractured face. The lower members of the formation consist of a brownish, arenaceous limestone, with but few or no fossils. The strike of the beds is W. 40° N. to N. 25° W., with a dip of from 40° to 65° S.E. The limestone is of Lower Cambrian age, and forms the youngest member of a W. flank of a great anticlinal fold which has in its centre the metamorphic and crystalline rocks of Pre-Cambrian age. About ½ mile E., in the "Blinman Gap," the limestone overlies a metamorphic sandstone and quartzite of the Pre-Cambrian complex. Owing to the uniformity of its weathering it is difficult to find places suitable for systematic quarrying, except by sinking on the formation. The most favorable spot is at the entrance to the "Gap," where the Parachilna Creek cuts through the beds and exposes about 15ft. to 20ft. vertically on the N. bank. At this particular site the fossils are moderately plentiful and the limestone is of a slaty blue color. A quarry could be opened here and blocks of considerable dimensions obtained. (2–10–10.) Stone of fair quality has since been excavated at this site and a trial load trucked to Adelaide for polishing. Archæocythinous and variegated Cambrian limestone from Sellick's Hill, S. of Adelaide, has been similarly treated. (30–10–10.)

Myponga Mercury Discovery.—The mercury mine is situated on section 1, hundred of Myponga, about 8 miles S.E. of Willunga. The country rock consists of clayslate, graphitic slate, phyllite, mica schist, and quartzite striking N., slightly E. These beds are overlain by comparatively recent detrital deposits, with much white quartz and nodular ironstone. The country is auriferous, and several abandoned gold mines exist in the vicinity, but no well-defined lode or body of ore occurs in the beds traversed by the tunnels in which the mercury was seen. This metal was found in the elementary form as small globules distributed over the surface of the rocks in the tunnels. The globules vary in size from that of fairly coarse shot to an excessively fine state of division, and occur either grouped or isolated. The mercury was seen on the surface only, although rock was repeatedly broken away in the hope of finding visible metal on the freshly-exposed face. It has been asserted, however, than when the fresh surface is left exposed to the atmosphere for some time the mercury "sweats out" of the rock and collects in the form of minute beads. This may be the case of rocks *in situ*, but did not happen with the broken specimens brought to Adelaide. It seems remarkable that the mercury in thus coming to the surface should not select the passages of least resistance and appear along the lines of cleavage and schistosity of the rock, rather than having to work its way in a direction at right angles to the layers of the lamellæ of argillaceous and secondary minerals. The mercury was found on all faces alike; in fact, in the majority of cases on the flat surfaces of cleavage or schistosity, some freshly-broken stone which did not show any trace of metal on the surface was "dollied" and "panned off," when the residue in the dish showed a dull-looking streak of mercury in an excessively fine state of division, which did not readily coalesce to the familiar shining and mobile globule. This class of stone, when left exposed to the sun's rays, is said to give up all its mercury in very short time. Repeated searching for cinnabar or other rarer combination of mercury was fruitless. Native mercury does certainly appear to exist in small quantity in the formation referred to (*vide* also report of Government Geologist, 11/5/91, page 355, Record), but no scientific explanation of the abundant appearance of the metal on the exposed surface can at present be given. For this reason it has been suggested to reinvestigate the mode of occurrence in order to conduct a few experiments on the spot. (14–12–10.)

Samples collected by the Assistant Government Geologist, which showed mercury freely on the surface, were brushed and scraped clean of all visible metal and analysed by Mr. J. D. Iliffe, B.Sc. With the exception of a faint doubtful cloudiness in the group precipitation the result was negative. (30–12–10.)

Kangaroo Island China Stone and Clay Deposits (*vide* also page 354, Record, and Review No. 9).—The deposit is situated about 8 miles S.E. of Hog Bay. As a result of the exceptionally wet season (1910) the mines were found in a flooded state and work had been suspended. The formation occurs under a comparatively flat surface-capping of coarse detritus, composed of quartz, mica and "ironstone shot." It is the product of decomposition of an immense body of granite rock, pegmatite, greisen, and graphic granite, which intrudes the mica schist that forms the bed rock of the district. Graphic granite, in particular, is typically represented. The pegmatitic rock contains, as an accessory mineral, tourmaline, which is of a green, pink, and black color, but often shattered. The felspathic disintegration has produced a white kaolin or pipeclay of different grades, whose commercial applications vary according to the siliceous admixtures they have derived from the original rock. Silica acts as a refractory agent and decreases the plasticity and fire shrinkage of the clay. The quantity of material available is practically inexhaustible. The clay is well suited for all ordinary purposes to which it may be put. A little preliminary testing of its refractoriness, plasticity, fire shrinkage, tensile strength, and fusibility is required, when by careful selection and admixture of material there is no reason why all better class wares for household, interior and exterior building, decorative, hygienic, electrical, and many other purposes could not be produced. It seems that our South Australian clays, which rank among the best in the world, have not received a fair trial, nor ever been submitted to expert or scientific treatment. (26–12–10.)

REPORTS FORMING ADDENDA TO THE RECORD OF MINES.

By Mr. H. JONES, Inspector of Mines.

Warra Warra (*vide* Record, page 144, Review No. 10).—Situated about 30 miles S.W. from Farina. Work has been carried on intermittently on the property for a number of years, and several shafts have been sunk on the line of lode to various depths of from 70ft. to 200ft., and, judging from the amount of work done at various points, a great quantity of ore must have been obtained. At the S.W. end of the workings an underlie shaft has been sunk to a depth of 125ft. At the 60ft. drives have been carried in on the course of the lode both N.E. and S.W., and a considerable amount of stoping done in the N.E. drive for fully 20ft. high. The ore body disclosed in the various drives and stope is from 6in. to 15ft. wide, and consists of ferruginous quartz and kaolin, impregnated with carbonates, with seams and bunches of copper glance, red oxide, and copper pyrites. The formation is fairly defined in all parts of the workings, and seems likely to continue down to great depth. At the time of my visit there was no one working on the mine. (4–6–10.)

Warra Warra West (*vide* Review No. 10).—A large copper formation traverses the block, striking N.E. and S.W., dipping S.E., and appears to be the continuation S.W. of the ore body operated on in the Warra Warra Mine. The principal workings consist of a shaft sunk 20ft. vertically and 40ft. on the underlie of the lode. At the 60ft. level drives have been carried in 70ft. N.E. and 10ft. S.W. The ore body disclosed consists of ferruginous quartz and slates, impregnated with carbonates, native copper, red oxide, and copper glance for a width of from 4ft. to 5ft. A width of from 12in. to 18in. near the hanging-wall contains fairly rich veins of copper glance and native copper. S.W of the shaft operations have been

carried on along the line of lode to a shallow depth for a length of 1½ chains, and from these workings a great quantity of ore was obtained. The formation in all the workings appears highly promising and well worth being further developed to a greater depth. A bulk sample from the face of the S.E. drive gave 5 per cent. copper, and two samples from the dumps of dressed ore at surface gave 17 per cent. and 12·5 per cent. (5–6–10.)

Eveline Copper Mine.—Situated about 2½ miles E. from Frome Well. A large formation traverses the block bearing E. and W., with dip N. The outcrop has been exposed at various points in shallow workings for a length of four chains. The main shaft is 5ft. x 3ft. in the clear, sunk on the lode to a depth of 25ft. At that level a drive has been carried in W. on the course of the lode for a distance of 35ft. The portion of the ore body operated on in the drive is from 4ft. to 5ft. wide near the footwall, with no hanging-wall exposed, containing nodules and veins of malachite and azurite, associated with quartz, kaolin, and gossan. The formation is soft and can be cheaply worked, and, if an adequate supply of water could be obtained on the property, the whole of the material from the lode could be concentrated to a fairly high-grade marketable product, and should pay well. The present main shaft is well situated, and to further prove the lode should be continued down to at least another 100ft., and at that depth, in my opinion, an ample supply of water would be met with, and the ore body could be operated on at that level. Samples of ore taken at time of my visit gave the following results :—

1. From W. drive, 3ft. wide	3·9	per cent. copper.
2. Width of 2ft.	15·4	"
3. From vein 18in. wide	22·9	"
4. Vein 5in. wide	34·9	"
5. Jigged ore	25·9	"
6. Tailings	7·2	"

There was also a trace of gold in two of the above samples. (20–6–10.)

Australian Silver-lead Mine.—Situated 1 mile E. of Avondale Mine. There are strong indications at various points on the surface of four parallel calcareous formations, 30ft. to 50ft. apart, containing silver-lead ore, traversing the property, bearing N. and S., and having a slight dip to the W. In the various shallow workings along the outcrops of the formations, the ore-bearing material consists of calcite and slates from 1ft. to 4ft. wide. The ore is chiefly galena, and occurs in veins of from 1in. to 5in. thick. Some of the veins are parallel with the lode, others crossing it. Work is carried on at present in developing the W. lode, and opencut workings on the formation have been sunk to a depth of 8ft. for a length of 15ft., disclosing a well-defined ore body from 1ft. to 2ft. wide, containing fine thick seams of galena for the whole length of the workings. Sample of ore taken at the bottom of the pits gave 5ozs. 12dwts. silver and 85·5 per cent. lead. Nine tons of ore have been recently extracted from the above open pit, and the formation in the bottom appears to be highly encouraging, and likely to carry high values in lead and silver to a considerable depth. (24–6–10.)

Gordon Reward (*vide* page 209, Record, and Reviews Nos. 8 and 10).—Situated near Williamstown. On the S. side of the old workings the present holder of the lease has been carrying on work for the last two months. Several small prospecting pits have been sunk to various depths, disclosing auriferous deposit from 4ft. to 6ft. thick, consisting chiefly of water-worn pebbles, sand, and clay, resting on a slate bottom and carrying rutile and a little gold. (15–7–10.)

Broken Range Silver-lead and Zinc Mine.—Situated about 2 miles from Rapid Bay jetty, and fully 400ft. above the sea level. Held for a time and worked under the name of Wheal Coglin Silver Lead Mine (*vide* Record, page 191). A

considerable amount of work appears to have been carried on at one time on the lease, and several underlie and vertical shafts have been sunk to depths varying from 20ft. to 250ft. A fair amount of driving and stoping has been done from the shafts, from which a quantity of silver-lead ore was obtained. There are numerous ore-bearing belts traversing the block, some of them bearing E. and W., others N. and S., and probably at the point of intersection of these belts some rich ore will be met with. Judging from what can be seen in the workings at various points on the property the ore appears to occur in shoots and pockets, with strong indications in places of them having been greatly disturbed by faults in the country rocks, thus making it rather difficult at times to follow the main ore channel. The principal work carried on recently on the property consists of two shafts 50ft. apart, sunk to a depth of 19ft. and 32ft., called No. 1 and No. 2 shafts, both being connected by an underlie sunk in the lode from the bottom of No. 1 shaft. In the underlie between the two shafts an irregular ferruginous formation is disclosed from 5ft. to 6ft. wide, having no defined walls, containing silver-lead and zinc ores, chiefly galena, cerussite, and smithsonite. Near the bottom of No. 2 shaft the formation appears to have been displaced on a fault. From that point the underlie has been carried down to a distance of 13ft., chiefly in country rock, with small veins of ore near the roof. At the bottom of the underlie a drive has been started and driven S.E. 6ft. At this point the ore body appears to be overhead, with an eastern underlie, and by extending the drive through the disturbed country it is quite possible that the continuation of the formation eastward will be met with, and when its position has been satisfactorily determined a site could be selected E. of the present workings for a main shaft to intersect the lode at from 100ft. to 150ft. to prove its value and extent at that level. Judging from what can be seen in the present limited workings and other parts of the property the prospects are highly encouraging and fully warrant it being further developed. Samples of the ore taken gave the following results :—

	Silver. oz. dwt.	Lead. %	Zinc. %
1. E. from bottom of No. 2 shaft, vein 12in. wide	2 16	8·8	31·5
2. Lode 6ft. wide in the underlie shaft between No. 1 and No. 2 shafts	1 6	5	35·9
3. Bottom No. 1 shaft, vein 18in. wide	4 8	9·6	25·1
4. From. No. 1 ore dump	4 0	15·7	30·7
5. From No. 2 ore dump	4 4	13·5	27·1

(19–7–10.)

Willunga Mercury Mine (*vide* Record, page 355).—Situated about 6 miles E. from Willunga township. Mercury in small quantities was discovered on the property about 19 years ago, and the prospector at that time did a fair amount of work in driving and sinking with a view to locate the formation containing the metal. The workings are situated about ½ mile S.E. from Meadow Creek, and consist of two tunnels. No. 1 tunnel was started level with the bottom of the gully and driven into the hill 100ft., cutting through the slate strata at right angles to the bedding. At a distance of 30ft. in the tunnel a formation of decomposed shale was intersected, strike E. and W., dip S., and is from 8ft. to 10ft. wide. Part of the formation for 2ft. wide near the hanging-wall is carrying a small percentage of metallic mercury, and the other part of the lode at that point is of no value. At 95ft. in the tunnel a soft vein of shale was met with 5in. to 8in. wide, carrying a little mercury. So far there has been no driving done on either of the veins to prove their value and extent E. and W. of the tunnel. A short distance E. of the last workings, and about 40ft. higher up the hill, No. 2 tunnel has been extended into the hill for a distance of 20ft. in country rock, but nothing of value was met with. About ½ mile E. from the tunnels a small prospecting shaft was sunk a few years ago near the bank of the Meadow Creek to a depth of 25ft. through alluvial

drift deposit in which, I was told, small quantities of mercury were obtained, and that mercury was also obtained in the bed of the small creeks in the vicinity of the shaft ; but, owing to the rain, the shaft was full of water, and the surrounding country for a considerable area was under water. Consequently there was no possible chance at that time to examine this part of the workings. One and one-eighth miles N. from the tunnels on top of the hill, 200ft. above the gully, there are four prominent outcrops of the country rocks, each from 30ft. to 60ft. wide, consisting of highly ferruginous clay shale with small veins of quartz in places through it. All over the hill for a considerable area the rocks exposed are of a similar nature, but do not appear to contain a trace of cinnabar ; but, from samples taken from the various parts of the property and workings, it is evident that there is mercury in the locality in small quantiites, but at present not of any commercial value, the veins intersected in the tunnel giving the best results. Drives should be extended E. and W. on their courses to prove them to a greater extent.

Samples taken from the outcrops and workings gave the following results :—No. 1 outcrop, three samples, nil. No. 2 outcrop, three samples, nil. No. 3 outcrop, four samples, nil. No. 4 outcrop, one sample, trace mercury. From first vein in tunnel, two samples, mercury, trace ; one sample, mercury 0·03 per cent. From No. 2 vein, one sample, mercury, trace ; one sample, mercury, 0·03 per cent. From side of tunnel between two veins, three samples, nil. From surface of rocks 400yds. from shaft, three samples, nil. One sample from No. 2 tunnel, nil. (28-7-10.)

Hamley Copper Mine (*vide* Record, page 61, and Reviews Nos. 9 and 10).—The principal work carried on at the mine underground at present is confined chiefly to stoping operations on the Karkarilla lode, above the 70, 60, 50, and 40 fathom levels. The ore body in the various stopes and drives is from 8ft. to 12ft. wide, containing veins and bunches of yellow and purple ore from 1in. to 9in. thick. Some of the veins are parallel with the ore channel, others crossing it. All the lode material broken in the faces is hauled to the surface and sent to the treatment plant, where it is crushed and concentrated to a marketable product of from 18 per cent. to 20 per cent. copper. At the present time the mine is worked at great disadvantage for the want of better facility to convey mullock into the stopes for filling in purposes, thus hindering the output of ore, with the result that the treatment plant can only be worked for a portion of the time. The formation operated on in the present workings is the hanging-wall portion of the Karkarilla lode, and it appears likely to continue along the line throughout the old workings. I examined all the accessible parts of the old drives and stopes, and in no place could I find the hanging-wall portion of the ore channel had been cut through and operated upon. Recently some prospecting work has been carried on at various points from the 70 fathom level upwards, and to a point 250ft. S. from the present stopes, with a view of proving the continuation S. of the ore body now operated upon, and at every point tested most satisfactory results were obtained. The lode in all parts of the workings appears to be exceedingly promising, and fully warrants opening out the mine and working it on a more extensive scale. The drives on the course of the present ore channel should be extended by rises starting from convenient points in the workings and carried up to the surface, thus proving the ore body ; and the rises when completed could be utilised for passes to convey mullock for filling in the stopes, which is essential both for safety and to facilitate the working of large ore bodies of the width disclosed. In consequence of the water being in the lower portion of the mine, it could not be examined ; but, judging from the workings on the plan it will be advisable, either at the present or some future time, to resume operations at the lower levels, and for this purpose pumping appliances will be required ; also, owing to the hard nature of the lode material, rock drills would be of great assistance in working the property. The ore-dressing plant is situated about ¼ mile from the principal shaft, and connected by a surface tramway worked by horse power, and drawing about 3 tons each journey. The treating

capacity of the crushing and dressing appliances is given by the manager as 18 tons per shift, or 54 tons in 24 hours. Although it is not considered an up-to-date plant, the low value of the tailings shows that it is capable of doing work and obtaining a very fair extraction, which can be improved by the addition of two or more Wilfrey tables, which would considerably reduce the cost of slime treatment. Twelve samples of ore were taken from various parts of the workings, not as bulk samples, but as showing the value of the various classes of ore throughout the workings. The ore treatment in the past indicates that the value of the crude ore, as sent in bulk to the mill, averages about 3 per cent., which may be improved by carefully selecting the ore-bearing material from the broken rock. The 12 samples taken gave the following results :—

	Gold.	Silver.	Copper. %
1. Top of winze, 40 fathom level	Trace	Trace	10·4
2. Face of N. drive, 40 fathom level ...	"	"	11·4
3. Footwall vein, 40 fathom level	1dwt.	3ozs. 11dwts.	37·2
4. Back of 50 fathom level	Trace	nil	5·7
5. Face N. drive, 50 fathom level	"	"	6·4
6. Vein back 70 fathom level	1dwt.	"	16·3
7. Footwall portion of lode, 60 fathoms.	Trace	"	5·8
8. Face S. drive, 70 fathom level	"	"	5·0
9. Side S. drive, 70 fathom level	"	1oz. 12dwts.	18·5
10. Old workings, 60 fathom level	"	3ozs. 16dwts.	40·2
11. Old workings, top of stope, 60 fathoms	1dwt.	nil	10·7
12. Old workings, 34 fathom level	1dwt.	Trace	16·3

The future prospects of the mine are highly encouraging, and when it is properly opened out, and the necessary addition made to the plant, it would have a reasonable chance to become a payable concern. (11-8-10.)

Copperlinka Gold Mine.—Situated about 10 miles S. from Olary Railway Station. A large and promising lode formation outcrops on the block, bearing N. and S., dipping W., and consists chiefly of quartz, clay slate, and iron, varying in width from 3ft. to 8ft., carrying fair value in gold. The principal work done on the lode consists of a shaft sunk to a depth of 30ft., and at that level a drive S. in the ore body for a total distance of 35ft. The lode disclosed in these workings is from 3ft. to 5ft. wide, fairly defined and likely to continue down. Two parcels of the ore obtained in driving and sinking have been treated at the Petersburg Cyanide Works. No. 1 parcel of 5 tons gave a return of 1oz. 14dwts. of gold per ton, and No. 2 parcel of 52 tons gave a return of 17dwts. of gold per ton. Two bulk samples from the formation, taken from different points in the south drive, gave 13dwts. and 14dwts. Judging from the samples and the large parcel of ore treated, the formation appears to be of the fairly uniform value of from 14dwts. to 17dwts. of gold per ton. This is highly encouraging, and the mine should, when properly opened out and worked on a large scale, prove highly payable. (8-9-10.)

King's Bluff (*vide* Record, page 223, and Reviews Nos. 8, 9, and 10).—Situated 4 miles from Olary. The main underlie shaft on the property has been sunk to a total depth of 600ft., but, as no work has been done in this shaft for several months, the bottom workings were full of water and could not be examined. No. 2 shaft, situated about 400ft. E. from the main shaft, has been sunk to a depth of 210ft., and has been carried down on the underlie of the formation. The gold-bearing material in these workings consists chiefly of decomposed slates and quartz, which occur in seams and pockets from 1ft. to 4ft. wide, enclosed in quartzite country. Some of the pockets are fairly large, and contain rich gold. Twenty tons of the lode material from the various workings treated by the battery on the mine gave

a total return of 19ozs. of smelted gold. The gold-bearing formation traversing the property is encouraging, and appears to be fairly extensive. To develop and work it at greater depth a vertical shaft should be sunk at a point about 8 chains S. from the present workings, which would facilitate the hauling of the lode material from the deep levels, and the mine could be opened out and worked on a larger scale. (8-9-10.)

Mount Grainger Gold Mine (*vide* Record page 250, and Reviews, Nos. 8 and 9).—Present work is chiefly developing the E. lode. On the E. side of Mount Grainger hill a vertical shaft was recently started, and has been sunk to a depth of 45ft. At that depth rich auriferous lode material was intersected. From that point the shaft has been carried down on the underlie of the ore body to a depth of 18ft. The gold-bearing material disclosed in the underlie for the total depth sunk on consists chiefly of ferruginous clay slate, with small veins of iron and quartz, from ½in. to 2in. thick, through it for a width of from 3ft. to 4½ft., all carrying gold. Coarse gold is visible in all the E. and W. veins and in the joints and cleavages of the slates. The rich shoot of ore in the bottom of the shaft appears to be strong and likely to continue down. To further prove and develop this promising run of gold the present shaft should be continued down to a depth of 100ft. or more, then drive in the ore body to prove its extent and value at that level. Jones's shaft, from which excellent results in gold were obtained recently, is situated about 50ft. E. of the present workings. The shaft was started from the outcrop of the lode, and sunk on the underlie of the shoot of ore to a depth of 73ft. At about 63ft. level the ore diverges W. for a distance of 12ft., and was lost for a time. Recently the continuation downwards of the same ore body was intersected in the new vertical shaft. The sinking of Jones's shaft for the first 63ft. was carried down in high-grade ore, and 85¼ tons obtained from the lode during sinking operations were treated at the Petersburg Cyanide Works, and gave 320oz. 18dwt. 23gr. gold, valued at £1,276 10s. 3d. General prospects of this property are highly encouraging, and when the mine is opened out and worked on a more extensive scale it should produce great quantities of payable ore. At the time of my visit there were about 9 tons of ore on surface, and judging form the results of dish samples washed should yield from 5½ozs. to 6ozs. gold per ton. Assays of samples of the ore material taken from the present workings gave the following results :—

	Gold.			Silver.	
	ozs.	dwts.		ozs.	dwts.
1. From second-class ore bagged	1	6	..	nil	
2. " vein of ore 2in. thick, 63ft. level	14	14	..	0	10
3. " cross vein " " "	0	3	..	—	
4. Slate and veins for 2½ft. wide, 63ft. level	6	17	..	—	
5. " " 2ft. " "	7	7	..	0	5
6. For 2ft. wide, centre of shaft, "	9	14	..	0	6
7. Ore bagged from 2 bags selected out of the lot..	21	3	..	1	0

(9–9–10.)

Dustholes Gold Mine (*vide* Record, page 214, and Reviews Nos. 8 and 10).—Situated about 2 miles N.W. from the Mount Grainger Mine. A large formation striking N.E. traverses the property, and prospecting work by shallow pits and trenches has been done for a considerable distance along the outcrop, disclosing gold-bearing material from 20ft. to 25ft. wide. From the various workings several parcels of from 5 tons to 100 tons of ore have been treated at the Government Battery and Cyanide Works, Petersburg, yielding from 6dwts. to 10dwts. of gold per ton. The formation consists chiefly of alternate layers of quartzite, slate, and sandstone, with numerous veins of ironstone and quartz of various thicknesses running through the whole formation from the hanging to the foot wall at an angle of 45°. The principal work at present in progress is on top of a hill about 100ft.

above the plain, where a vertical shaft has been sunk to a depth of 30ft. This shaft is fairly well situated for prospecting the lode, and should be continued down through the formation to prove its width and value at this point in the property. At the 20ft. level a drive has been carried in S.W. on the course of the lode for a distance of 60ft.; the gold-bearing material disclosed along the drive and in the face consists of sandstone, quartz, quartzite, and ironstone veins for a width of 4ft. Five samples taken from the workings and assayed at the School of Mines gave the following results :—

	Gold.		Silver.	
	ozs.	dwts.	ozs.	dwts.
No. 1. From bottom of 30ft. shaft	trace		—	
No. 2. N.W. vein, face of drive	8	5	1	18
No. 3. S.E. " "	0	15	—	
No. 4. From width of face, 4ft.	0	11	—	
No. 5. From quantity of ore broken (vein)	4	4	0	16

The above samples show that the small ironstone and quartz veins traversing the formation carry most of the gold, and to operate on such a large body of ore-bearing material to the best advantage it is necessary that the mine should be opened out on a more extensive scale, and by carefully selecting the gold-bearing ore from the barren rock great quantities of high-grade milling ore would be obtained, and should pay well if treated by an up-to-date plant erected on the mine. (9–9–10.)

Kitticoola (*vide* Record, page 70, and Review No. 9).—Situated 1½ miles from the township of Palmer. The property consists of 380 acres held by the Port Lincoln Company. The mine was recently let on tribute to a party of miners for a period of five years. Since the party took over the mine a complete crushing plant has been installed, comprising a five-head stamp battery (10cwts. each), engine, and boiler. All the plant has been housed in and erected on a very convenient site near the mouth of the adit, so that the lode material from the present workings can be conveyed on trucks at a comparatively small cost direct into the ore bin. At the 180ft. level mining operations are still in progress. The N. drive at this level is in a total distance of 380ft. from the underlie shaft. In several places along the drive the ore body appears to have been disturbed by faults crossing the channel in a slanting direction from the foot to the hanging wall. The intrusive belts or faults are generally from 4ft. to 6ft. wide, traversing the ore channel for a considerable distance, displacing the ore body, which, at a distance, thins out to nothing on one side of the channel, causing considerable trouble sometimes; but generally a new run of ore has been discovered a short distance away in the opposite wall at the back of the intrusive belt. At a distance of 133ft. in the drive N. of the underlie shaft, ore body is disclosed and has been operated on for a length of 103ft. It consists of ferruginous quartz from 2ft. to 5ft. wide, carrying gold. A rise has been put up in the formation 20ft., and the ore for that distance appears to be very promising. About 24ft. N. from the rise a winze has been sunk down through to the 240ft. level. The ore body disclosed is fairly defined, and from 3ft. to 5ft. wide, carrying gold. At a distance of about 60ft. N. from the last winze, No. 2 winze has been sunk to a depth of 20ft., and the lode formation sunk on is from 4ft. to 7ft. wide, carrying gold. About 29ft. S. of the last winze a rise has been started on a new make of ore in the footwall, and has been put up 12ft. The lode consists chiefly of quartz, making wider going up. When it started it was only 3in. thick, and now in the face of the rise it is fully 20in. wide, carrying a little gold. From the top of No. 2 winze the N. drive is in a total distance of 135ft., and appears to have been carried in on the course of the same shoot of ore as that operated on in the rise. The lode disclosed along the drive consists of quartz from 6in. to 24in. wide for a length of 100ft. Then it gradually thins out to nothing, and the drive from that point was continued in barren country. At the 240ft. level—the deepest

workings that could be examined owing to the lower levels being full of water—the N. drive has been extended in a total distance of 410ft. At that point the drive is connected with the vertical shaft sunk from the top of the hill. The lode material along the drive is similar in character to that in the upper level, and the ore channel appears to have been disturbed at various points by faults. Since the present party of tributers commenced working the mine a parcel of 14 tons 15cwts. of lode material from the 180ft. level have been treated at the Mount Torrens Cyanide Works, and gave a return by battery and cyanide of 1oz. 5dwts. of gold per ton. There appears to be a considerable quantity of milling ore, both above the 180ft. and 240ft. levels, available for stoping out, which should prove remunerative with the present facility for treating ore on the mine. Eleven samples of the lode material taken from various parts of the workings were assayed at the School of Mines at Adelaide, and gave the following results :—

	Gold.			Copper.
	oz.	dwts.		%
1. Back of drive 100ft. N. of No. 2 winze.....	0	10	..	—
2. " 50ft. " "	0	4	..	0·7
3. Bottom No. 2 winze for 3½ft., from footwall to centre	0	5	..	0·5
4. Bottom No. 2 winze for 4ft., from centre to hanging-wall	0	7	..	2·0
5. Back of drive 20ft. S. of No. 2 winze, 3ft. wide.	0	5	..	1·7
6. Face No. 2 rise, 20in. wide	0	3	..	0·5
7. Back of drive near No. 1 rise, 4ft. wide	1	1	..	0·4
8. Back of 240ft. level, 240ft. N. from shaft.....	0	3	..	0·9
9. " " 313ft. "	0	13	..	7·1
10. Bottom No. 1 winze, 240ft. level	1	9	..	1·1
11. Back of drive, 180ft. level	0	14	..	0·5

(14–9–10.)

Deloraine Gold Mine (formerly named "Day Spring," *vide* Review No. 10).—Situated about 7 miles S.W. from Williamstown. Principal work carried on at present on the property is confined chiefly to the sinking of No. 3 underlie shaft in the lode formation, which contains rich gold for the whole depth sunk on. Seventy-eight tons of ore obtained from this shaft and treated recently at the Government Cyanide Works, Mount Torrens, yielded 2ozs. 5dwts. of gold per ton; and at the time of my visit there was a considerable quantity of ore on the surface that had been extracted during the last few weeks' sinking operation, which the manager anticipates will yield good returns. The shaft is 9ft. by 4ft. 6in. in the clear, strongly and securely timbered from surface to the bottom, a depth of 43ft. The formation disclosed in the shaft consists of ferruginous quartz and decomposed material. The main part of it, which appears to carry the greatest portion of the gold, is from 2ft. to 2ft. 6in. wide, but the width and value of this promising formation can be further determined when the shaft has been sunk to a greater depth by extending short crosscuts into both walls. Four samples taken of the formation at the bottom of the shaft gave the following results :—No. 1, along the centre of the shaft, gave 4ozs. 14dwts. gold per ton, and 5·2 per cent. copper. No. 2, across N. end of shaft, 6dwts. gold per ton, and 8·6 per cent. copper. No. 3, hanging-wall of shaft, gold, trace, and 0·5 per cent. copper. No. 4, across S. end of shaft, 6dwts. of gold per ton, and 1·4 per cent. copper.

Prospecting, or No. 2 shaft, which, at the time of my visit was nearly full of water, is situated 8 chains to 10 chains S. of No. 3 shaft, and has been sunk on the underlie of the lode formation to a depth of 32ft. Two parcels of ore have been treated from this working at the Government Cyanide Works, Mount Torrens. The first 10 tons treated gave a return of 3ozs. of gold per ton, and the second parcel of 62 tons 12cwts. yielded 1½ozs. gold per ton.

About 450yds. S. from the last workings No. 5 shaft has been started and sunk to a depth of 12ft. The formation disclosed is quartz and decomposed material, which at present depth contains no mineral value. No. 4 shaft, situated about 500yds. N. from No. 3 workings has been sunk 9ft. in ferruginous formation. A sample taken of the material from the shaft gave 3dwts. of gold per ton.

From the ore bagged at No. 3 shaft, a sample taken gave 1oz. 4dwts. of gold per ton, and 1·3 per cent. copper. Sample taken from a parcel of ore ready for bagging gave 1oz. 9dwts. gold per ton, and 2·2 per cent. copper.

The development so far on the property is highly encouraging, and, judging from the appearance of the formation in the present limited workings, there are fair indications that the ore body is extensive and likely to continue down. Sinking of Nos. 1 and 3 shafts should be carried down into more settled country, to further prove and develop the lode at greater depth—which so far has proved fairly rich in gold to a shallow depth. (16–9–10.)

Kanappa Copper Mine.—Since my last visit to the mine work has been started. The tunnel from the foot of the hill has been cleaned out and put in order preparatory for extending the N. drives in the ore bodies. At a point 114ft. in from the mouth of the tunnel No. 1 lode was intersected, and driving N. on the course of the lode has been carried in for a distance of 30ft.; also a considerable amount of stoping has been done for a length of 22ft. From these workings a fair quantity of high-grade ore was obtained. The ore body operated on in the stope appears to have been from 1ft. to 3ft. wide, and consists chiefly of carbonates; in the face of the drive the lode has pinched small, and is only about 3in. wide, but it is quite probable that, judging from what can be seen in the surface workings along the line, the ore channel will be found to be much wider, and to contain pockets of good ore when the driving is extended farther N. Taking the bearing of No. 1 lode for the distance driven on it should have intersected No. 2 lode at a point 60ft. N. of the tunnel in the vicinity of the winze; but, as far as I could see, there is no indication in any part along the drive of a junction of the two lodes, so that it is quite likely the point of intersection will be found some distance farther N. from the present face of drive. About 33ft. W. from No. 1 lode No. 3 lode was intersected, and the drive N. on the body is in a total distance of 84ft. The lode formation disclosed in the drive consists chiefly of quartz and schist, thickly impregnated with carbonates, from 6in. to 3ft. 6in. wide. Stoping operations have been carried on over the drive for a length of about 40ft., and up to the surface from these workings a considerable quantity of high-grade ore was extracted. At a point 58ft. in the drive a winze was started and sunk a short distance, and the formation disclosed consists of quartz and schist impregnated with patches and seams of yellow ore. A sample of the ore body from the back of the drive, near the top of the winze, for 3ft. wide gave 9·4 per cent. copper. Nearly all the old dumps or spoil heaps on the surface appear to contain a fair quantity of ore, and eight samples taken from various piles, totalling about 1,870 tons, gave an average value of 4·2 per cent. copper, and three samples from small dumps of about four tons gave an average of 9·5 per cent. copper. Another sample from 87 bags of ore gave 11·9 per cent. copper. The lode formation in the faces of both drives at present is small and poor; but still the property has a fair speculative value, and when driving N. in the channel is extended it is quite possible that other rich pockets of ore will be met with. (12–11–10.) (*Vide* Record, page 65.)

Mount Fitton South (*vide* Record, page 89, and Review No. 9).—Inspected on 10th June. The principal work carried on at present on the property consists chiefly of extending the tunnel S. on the course of the lode. Recently 70ft. of driving has been done on the ore body, making the total length of the tunnel 285ft. The lode formation disclosed in the drive and the various workings is from 8ft. to 12ft. wide, and consists of quartz and iron, with seams and bunches of rich

copper ore through it—chiefly grey ore, green carbonates, and copper glance. It also contains a little gold and silver; 4 tons 15cwts. of the ore obtained in extending the drive have been treated, and gave a return of 34¾ per cent. copper. From the bottom of the winze, 40ft. below the tunnel, the S. drive on the hanging-wall portion of the lode has been driven 42ft. Stoping operations have been carried on over the drive to within a few feet of the tunnel. From these workings a considerable quantity of high-grade ore was obtained. Five samples taken from the lode and tailings heaps gave the following results :—

1. Concentrates, 5dwts. gold, 1oz. 2dwts. silver, 22·8 per cent. copper.
2. From elevator boot, 1oz. gold, 10dwts. silver, 9·3 per cent. copper.
3. Four tons dressed ore, 1dwt. gold, 2ozs. 11dwts. silver, 37·9 per cent. copper.
4. From face of drive, 16dwts. silver, 10·3 per cent. copper.
5. Tailings, 3·7 per cent. copper.

(16–11–12.)

Windy Creek Copper Mine.—Situated 1½ miles S.W. of Parabarana Hill. A large ferruginous lode formation traverses the property and can be traced on the surface for a length of 450ft., bearing E. and W. and going down vertically. The principal workings are situated on the W. side of the hill, about 60ft. above the gully, and consists of a tunnel driven into the hill in country rock for a distance of 120ft. At that point the ore-bearing material was intersected, and a drive has been carried E. in the formation for a distance of 36ft. The ore body disclosed is from 6ft. to 12ft. wide, and consists of quartz, iron, and decomposed slates, with veins and bunches of grey ore, copper glance, and green carbonates all through the matrix.

About 140ft. E. of the tunnel, and 60ft. farther up the hill, a shaft has been sunk in the formation through to the E. drive, making the ventilation good throughout the workings. Stoping operations have been carried on E. and W. from the shaft, and a considerable quantity of high-grade ore was extracted from the workings.

No. 2 shaft is situated about 110ft. E. along the line of lode from the last workings, and has been sunk in the formation to a depth of 50ft. The ore body disclosed is fully 6ft. wide, with green carbonates all through it.

In the open cut workings, 200ft. E. from No. 2 shaft, a fair amount of work has been done on the lode to a shallow depth. The ore body disclosed in the workings is wide, and of similar quality to that in other parts of the mine.

The prospects of this property are highly encouraging. The lode is large and a true fissure one, likely to be permanent and to continue down to a great depth. Four samples of ore taken gave the following results :—

1. Sample of screenings, 10·2 per cent. copper.
2. Dressed ore, 33·6 per cent. copper, 5ozs. 12dwts. silver.
3. Face of drive—6ft. wide, 17·6 per cent. copper, 16dwts. silver.
4. Picked ore, 61·1 per cent. copper, 6dwts. silver.

(17–11–10).

Benalack Copper Mine (*vide* Record, page 28, and Review No. 9).—Situated 1 mile E. from Nicholl's Knob. At the 60ft. level in No. 3 shaft stoping operations are being carried on over the N.W. drive, and the lode is from 12in. to 18in. wide, carrying high grade ore in seams and bunches, chiefly malachite, bornite, and copper pyrites. Sample of ore from stope gave 37·3 per cent. copper, 2dwts. gold, and 1oz. silver. About 160ft. N.W. from No. 3 a new underlie shaft was recently sunk on the lode to a depth of 50ft. The lode is well defined, and consists of ferruginous calcite from 12in. to 15in. wide, containing high-grade ore; and a sample

for the full width of the ore body at the bottom of the shaft gave 2dwts. gold, 14dwts. silver, and 32·3 per cent. copper per ton. The lode is strong, and appears likely to continue down. Shaft-sinking should be continued to prove and develop it at a greater depth. (18-11-10.)

Paull's Consolidated Copper Mine (*vide* Record, page 116, and Review No. 9).—Stoping operations and driving have been carried on at different levels in the mine, and fairly high-grade ore has been obtained from the various workings. The formation operated on is from 4ft. to 10ft. wide, containing rich veins of ore from 1in. to 4in. wide, with bands of lower-grade ore material between. Two samples of the vein gave 13·8 per cent. and 17 per cent. copper. (18–11–10.)

Phil-ma-cool Copper Mine (*vide* Review No. 9, page 34).—This property is situated 5 miles N.W. from Burr Well. The principal work carried on at the mine at present is extending the S. drive on the course of the lode at the 30ft. level. The formation operated on consists of decomposed slates from 4ft. to 5ft. wide, containing small seams and nodules of grey ore and green carbonates. A sample of the ore taken across the face of the drive gave 19·2 per cent. copper. In the present shallow workings the ore-bearing material appears to be highly promising, and should be tested to a greater depth. (18-11-10.)

Belliak (*vide* Review No. 9, page 32).—Situated 1 mile from Mount Lyndhurst. A considerable amount of work has been done on this property in shaft-sinking, driving, and stoping, and from the various workings a large quantity of payable ore was extracted. The present holder of the property started a new shaft a short distance E. of the old workings. Sinking is now in progress, and the shaft is down to a depth of 15ft. The ore-bearing material disclosed in the new shaft consists chiefly of shale, impregnated with veins and patches of green carbonates and grey ore. Sample of the formation taken at the bottom of the shaft gave 21·3 per cent. copper. (18–11–10.)

Diamond Jubilee (*vide* Record, page 49, and Review No. 9).—This property is situated 9 miles E. from Leigh's Creek. The principal work carried on at present on the property is the sinking of a new shaft on the N. lode. The shaft is down 8ft., and the ore body disclosed is from 12in. to 15in. wide, containing rich veins of grey ore and green carbonates and small patches of copper pyrites. Sample of the ore from the bottom of the shaft gave 8dwts. silver and 26·6 per cent. copper per ton. (18–11–10.)

Black Eagle Copper Mine (*vide* Reviews Nos. 9 and 10).—One mile S. from Ediacara Mine. Principal work carried on at present on the property consists chiefly in driving a new adit into the hill at a point about 60ft. N. of No. 2 workings, with a view of intersecting the ore body at a point about 10ft. below the previous workings. The new drive is in a total distance of 45ft., and should intersect the ore body in about 30ft. more driving. When the work has been completed and the drive connected with No. 2 workings, it will greatly facilitate the handling and conveying of the ore from the various working places to the surface. Six tons of ore recently treated from the mine gave 18 per cent. copper. Sample of ore taken from the face of E. drive gave 14·9 per cent. copper and 10dwts. of silver. Sample taken from best dressed ore dump gave 24·3 per cent. copper. (30–11–10.)

Ediacara Silver-lead Mine (*vide* Record, page 168, and Review No. 9).—Stoping is in progress N. and E. of the vertical shaft at the 32ft. level. The formation in the stopes is from 3ft. to 4ft. wide, carrying silver-lead ore and copper. Sample taken from dressed parcel, lead ore, gave 52·2 per cent. lead, 0·6 per cent.

copper, and 11ozs. 6dwts. of silver per ton. Sample taken from dressed parcel of copper ore gave 24·9 per cent. copper, 11·0 per cent. lead, and 412ozs. silver per ton. (30–11–10.)

Mount Coffin (*vide* Record, page 49, and Review No. 9).—Situated 8 miles N.E. from Leigh's Creek. Stoping operation is in progress over the E. drive at 60ft. level in the underlie shaft; the formation enclosed in the workings is from 2ft. to 3ft. wide, containing seams and patches of grey ore and green carbonates fairly disseminated through the matrix. Sample taken from picked ore from the various veins gave 12dwts. silver and 25·9 per cent. copper. (8–12–10.)

Wild Dog (*vide* Reviews Nos. 9 and 10).—Situated 2 miles from Leigh's Creek. Principal work in progress on the property is the sinking of a new shaft at the N.E. end of the old working. The shaft is down a total depth of 28ft. on the footwall position of the formation, which consists of decomposed slates impregnated with green carbonates and small veins of grey ore. Of the last 5 tons of ore sent away from this mine, 3 tons gave 17 per cent. copper, 1 ton 31 per cent. copper. Sample taken from ore dump gave 25·3 per cent. copper. (8–12–10.)

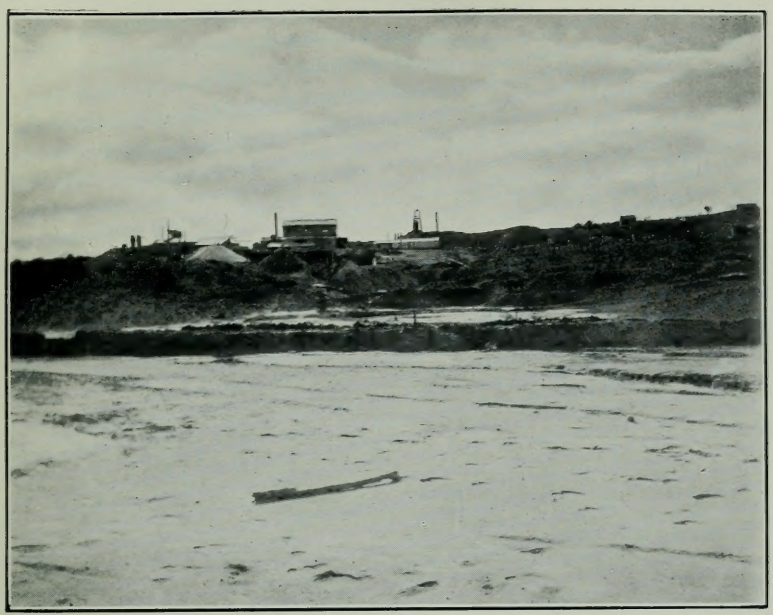
Mountain of Light (*vide* Record, page 129, and Reviews Nos. 8 and 10).—Near Leigh's Creek. There is no work of any kind carried on at the mine at present. The winding plant on the main shaft has been dismantled and removed from the property. (8–12–10.)

Green Rock Copper Mine.—Situated 6 miles N.E. from Sliding Rock, in a gully surrounded by rugged hills 100ft. to 200ft. high. A ferruginous lode formation outcrops, striking N.E., dipping N.W., and consisting of quartz, ironstone, and slate from 2ft. to 6ft. wide, and containing stains and small veins of malachite. About 8ft. above the level of the gully two underlie shafts have been sunk on the formation 40ft. and 60ft. In the 60ft. shaft a fairly defined footwall is disclosed all the way down, and the ore-bearing material is from 4ft. to 5ft. wide, carrying small veins and specks of carbonates. Sample of the formation taken from the bottom workings gave 9·9 per cent. copper and 5dwts. 8ozs. silver. On the S.E. side of the gully open cut workings disclose low grade ore-bearing material 8ft. wide, containing specks and stains of green carbonates. Near this a vertical shaft, 5ft. by 4ft. in the clear, has been sunk to a depth of 65ft., but nothing of value was met with. About ¼ mile N.W. from the main workings there are three other lode outcrops, striking E. and W. and dipping S. They are from 30ft. to 40ft. apart, consist chiefly of ironstone 1ft. to 3ft. thick carrying copper stains, are well defined, and fully warrant prospecting work being done on them to prove their values. (6–12–10.)

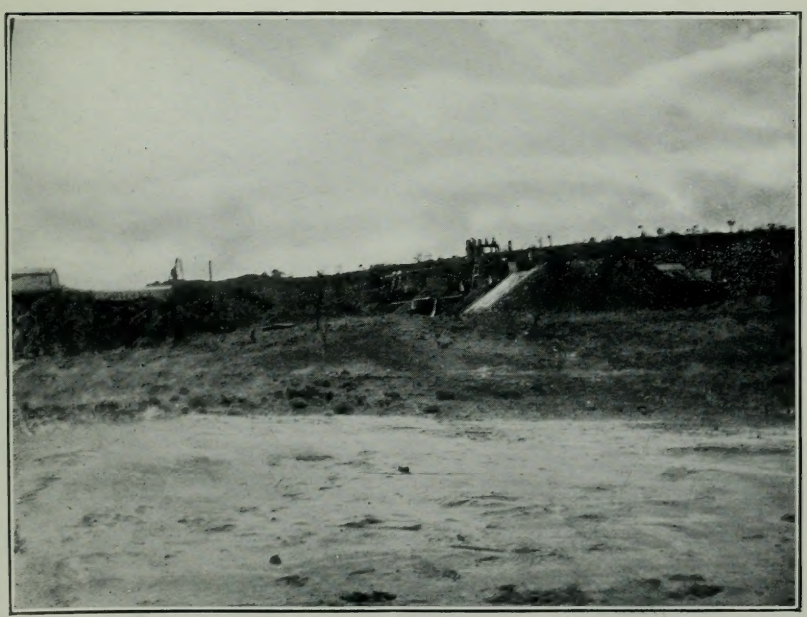
TARCOOLA BLOCKS MINE.

GOURLAY'S CAMEL TEAM.

TARCOOLA BLOCKS MINE.



BATTERY, UNDERLIE SHAFT, ETC.



MAIN SHAFT—PUMP AT WORK.